CAMERON COUNTY

AN ANALYSIS OF PROBLEMS

PENNSYLVANIA STATE PLANNING BOARD

HARRISBURG, PA.

- 1937 -

PENNSYLVANIA STATE PLANNING BOARD

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Harrisburg, Pennsylvania

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG

December 29, 1937

The Honorable George H. Earle, III
Governor of Pennsylvania
Harrisburg, Pennsylvania

Dear Governor Earle:

The State Planning Board respectfully submits a report entitled "Cameron County, An Analysis of Problems."

A preliminary determination by the State Planning Board has shown that at least one-fourth of the Commonwealth is made up of areas which are faced with the necessity of readjustments in land use. Out of these "problem areas", Cameron County was selected as a convenient sample for the detailed analysis submitted herewith.

The Board feels that the translation into action of the recommendations contained in this report and of similar recommendations applicable to other "problem areas" would be most advantageous not only to the locality concerned but also to the Commonwealth as a whole.

Very truly yours,

Ralph M. Bashore

Ralph M. Bashore
Chairman

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG

December 10, 1937

Hon. Ralph M. Bashore, Chairman
State Planning Board
Harrisburg, Pennsylvania

Dear Mr. Bashore:

I respectfully submit herewith a report entitled, "Cameron County, An Analysis of Problems." This detailed field study covers one of many areas in which there are major problems requiring readjustments in land use.

In presenting this study we wish to express our appreciation to those who assisted us in the collection and analysis of the data.

Mr. L. Z. Holcombe, who supervised this study for the State Planning Board, received invaluable assistance from individuals and local officials in Cameron County.

Mr. Virgil Hurlburt, Land Planning Specialist, Farm Security Administration, United States Department of Agriculture, with the help of other employees of the Farm Security Administration, prepared the section on Land Use and gave us the benefit of his suggestions on other parts of the report.

Data from the records of several State Departments were used, as is mentioned in the text. Various members of the faculty of the Pennsylvania State College also gave valuable suggestions.

Very truly yours,

F. A. Pitkin
Executive Director

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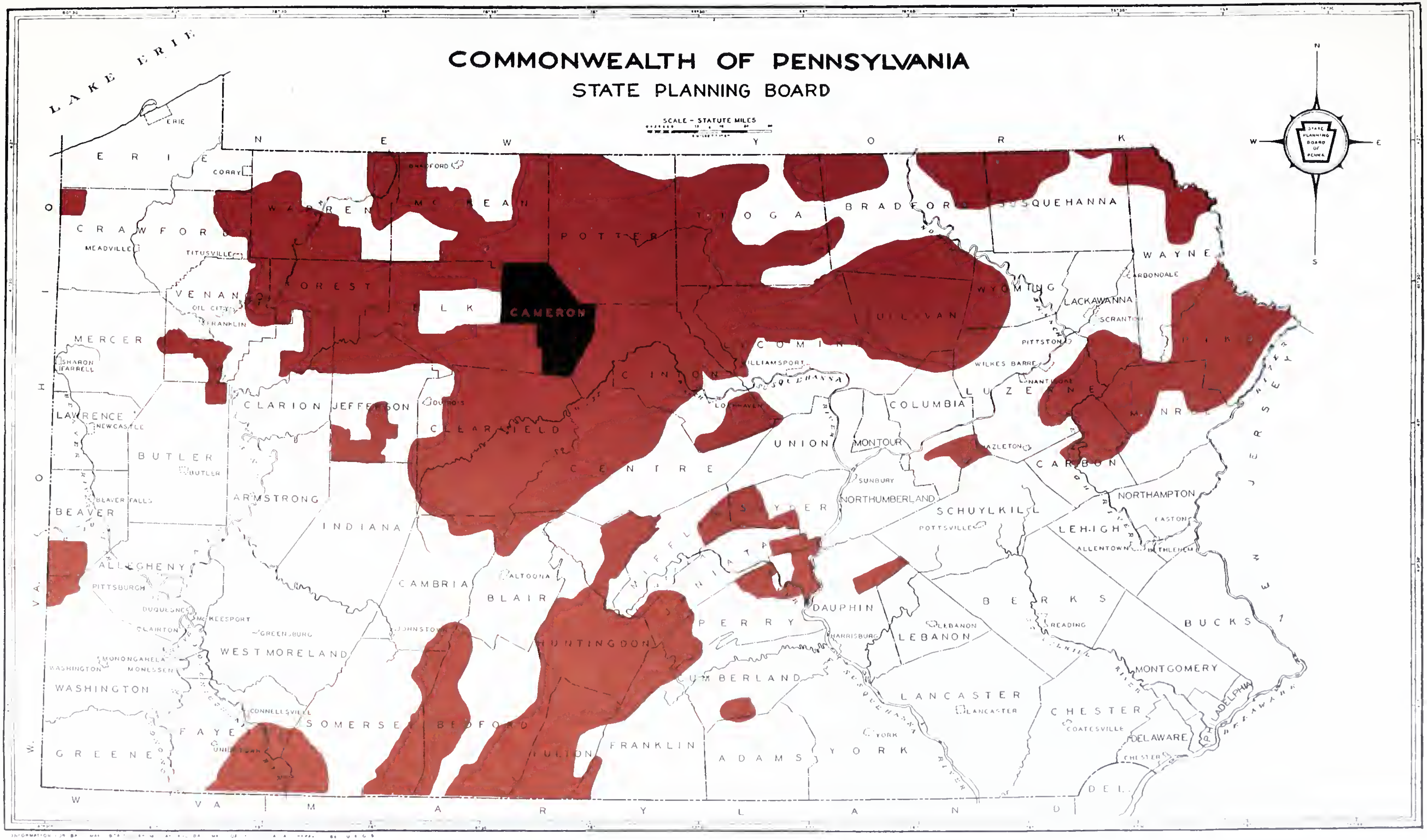
## T A B L E S




CAMERON COUNTY'S RELATIONSHIP TO THE OTHER PROBLEM AREAS

NOTE: PROBLEM AREAS SHOWN IN RED

## PRINCIPAL FINDINGS AND RECOMMENDATIONS

### FINDINGS

Adverse factors related to "problem conditions" in Cameron County may be summarized as follows:

1. Use of land for purposes to which it is not adapted.
2. Continuous land abandonment and presence of idle land.
3. Inability to compete with other areas in agricultural production.
4. Climatic, topographic and soil handicaps.
5. Sparse and isolated settlement.
6. High State subsidy for schools and roads.
7. Excessive school costs per pupil.
8. Maintenance of roads of doubtful economic justification.
9. Governmental units too small for economical operation.
10. Damage to crops by deer.

Favorable conditions or potentialities in Cameron County include the following:

1. Extensive area suitable for reforestation.
2. Existing and potential recreational resources.
3. Almost complete absence of local bonded indebtedness.
4. An active industrial development, localized in one community.

## RECOMMENDATIONS

To assist in the solution of the problems existing in Cameron County, the State Planning Board recommends:

1. Adoption of rural zoning ordinance.
2. Planned and coordinated State purchase of land.
3. Restoration of more land to forests.
4. Gradual relocation of isolated settlers.
5. Greater development of recreational facilities.
6. Modification of present basis for State grants in lieu of taxes.
7. Revision of method of distributing State aid to schools.
8. Consolidation of school districts.
9. Consolidation of townships.
10. Extension of State control over all township roads.
11. Revision in method of assessment and collection of taxes.

# CAMERON COUNTY - AN ANALYSIS OF PROBLEMS

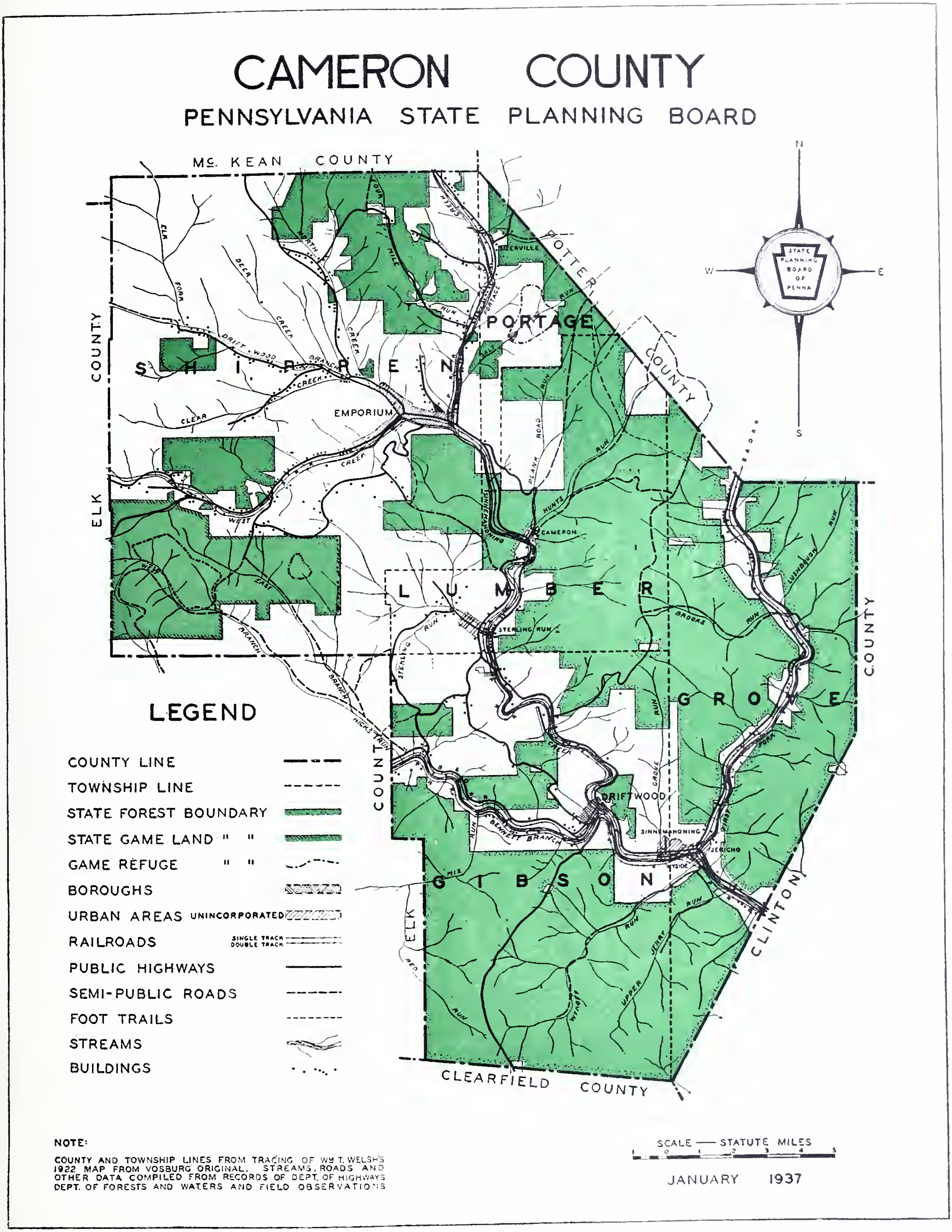
## INTRODUCTION

In the report entitled "Problem Areas in Pennsylvania" the State Planning Board delimited sections of the State in which maladjustments in land use are present. The report, in some respects, was of a generalized nature and did not specifically analyze the problems peculiar to any particular area. It recommended, however, that detailed field studies be made in the "Problem Areas" to refine the limits and to determine causes and solutions for the problems. This analysis of Cameron County is the first such field study.

In selecting the area to be covered by this study, it seemed desirable to present a unit consisting of an entire County. Cameron County is wholly within the "Problem Areas" and the problems of the County are considered to be representative of some of the conditions found in this section of the State. Facts are presented impartially for the purpose of creating interest in originating remedial measures for the undesirable situations existing in our economic and social life. It is not assumed that all of the conditions analyzed in this study are prevalent in all of the "Problem Areas" in the State, but this study does provide a specific example of conditions actually existing in one type of area. It is hoped that the findings and recommendations of this study will be of value not only to Cameron County, but to other Counties and localities as well, in analyzing their problems and instituting corrective measures.

Most of the existing situations have been caused by reasons beyond the individual control of the persons concerned. Comparable conditions exist not only in other counties of this State, but also in other States. Large parts of the Lake States of Michigan, Minnesota and Wisconsin present similar situations.

There is no intention in this report in any way to discredit the officials of the County, the inhabitants, or the County in general. The County and Township officials and other residents have indicated throughout, their friendly interest in the work and have cooperated generously in the gathering of the data.


CAMERON COUNTY
PENNSYLVANIA STATE PLANNING BOARD
MC. KEAN COUNTY
POTTER COUNTY
CLINTON COUNTY
CLEARFIELD COUNTY
ELK COUNTY
SHIPPEN
PORTAGE
LUMBER
GROVE
GIBSON
EMPORIUM
CAMERON
DRIFTWOOD
SINNEMAHONING
JERICHO
WYSIDE
SIZERVILLE
STATE PLANNING BOARD OF PENNA
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COUNTY LINE
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STATE FOREST BOUNDARY
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BOROUGHS
URBAN AREAS UNINCORPORATED
RAILROADS
SINGLE TRACK
DOUBLE TRACK
PUBLIC HIGHWAYS
SEMI-PUBLIC ROADS
FOOT TRAILS
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COUNTY AND TOWNSHIP LINES FROM TRACING OF WM. T. WELSH'S 1922 MAP FROM VOSBURG ORIGINAL. STREAMS, ROADS AND OTHER DATA COMPILED FROM RECORDS OF DEPT. OF HIGHWAYS DEPT. OF FORESTS AND WATERS AND FIELD OBSERVATIONS
SCALE — STATUTE MILES
JANUARY 1937

FIGURE I

## COUNTY ORIGIN

## AND GENERAL DESCRIPTION

### ORIGIN

Cameron County, located in the north central part of Pennsylvania, was originally included in a territory acquired by what is called the "New Purchase". The treaty of transfer was signed by the chiefs of the Six Nations, October 23, 1784 and was confirmed by the Wyandotte and Delaware Indians January 21, 1785.

The area now comprising the County was settled slowly because of its very rough topography. Boats and rafts on the streams afforded the only ingress. By 1820 there were not more than seven families located on the site of present Emporium. A few settlers were also scattered along the main streams.

In the years following, partial isolation and distances from the various seats of county government having jurisdiction over different parts of the area, caused a growing sentiment among the residents of Emporium and surrounding territory for the formation of a separate county. On March 29, 1860, Cameron County was formed from parts of Elk, Potter, McKean and Clinton Counties, and was the 66th county formed in the State. The area contained 250,880 acres. It was named after Simon Cameron, who at the time was a leading figure in Pennsylvania politics and later served as United States Senator.

Seven civil-subdivisions were created - five second class townships and two boroughs. The townships were named Gibson, Grove, Lumber, Portage and Shippen, and the boroughs, Emporium and Driftwood.

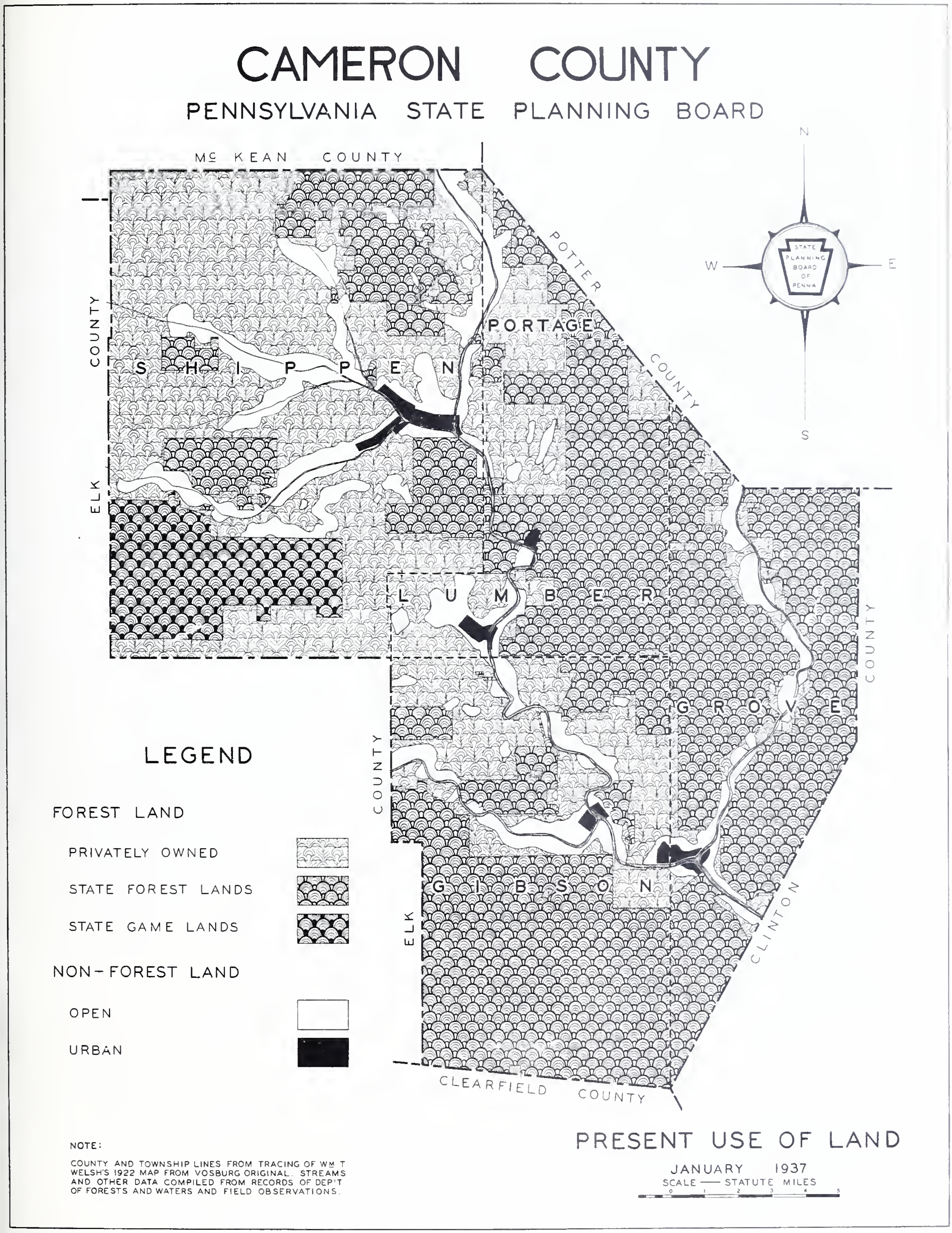
Emporium was made the county seat.

TOPOGRAPHY

The County is located on the Allegheny Plateau near its eastern edge. The terrain is one of the roughest in the plateau region, consisting mainly of deep, narrow, V-shaped valleys with steep slopes. The ridges are angular, in contrast to the rounded ridges of the glaciated area farther north. There are also steeply sloped valleys where the terrain broadens out into undulating hills and flatter ridges cut by smaller valleys.

The County is drained by numerous small creeks flowing into the Sinnemahoning Creek and its two large branches, Bennett Branch and First Fork. (See Figure I). The general direction of drainage is southeasterly. The streams in the narrow valleys are narrow-channeled, relatively swift, with numerous small waterfalls. In the broader valleys the stream beds are wider and shallower. The Sinnemahoning Creek joins the West Branch of the Susquehanna River a few miles beyond the Clinton County line.

Topographic maps are not available for the County, but elevations range from approximately 800 feet to over 2,100 feet above sea level. Elevations vary as much as 1,200 feet between valley floor and ridge top. Along the broader valleys the break between valley and ridge is abrupt, and in many instances sheer. The rough topography of the County is indicated by the following reported altitudes: Emporium 1,031 feet; hill just south of Emporium 2,112 feet; Driftwood depot 816 feet; hill just west of Driftwood 2,025 feet; Sinnemahoning depot 794 feet.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PRESENT USE OF LAND
JANUARY 1937
SCALE — STATUTE MILES
0 1 2 3 4 5

FIGURE II

## STATE OWNED LAND

Since 1900 the State has been active in purchasing land in the County. The Department of Forests and Waters and the Game Commission on January 1, 1936 owned 130,874.2 acres or 52.2 per cent of the total area of the County. The location of State owned land is shown by Figure II.

Table 1 shows the total area and the distribution of State owned land by townships.

- TABLE 1 -

STATE FOREST AND GAME LANDS IN
CAMERON COUNTY-Jan. 1, 1936.

| Township | Total Area (Acres) | State Forest Lands (Acres) | State Game Lands (Acres) | Total State Owned Land (Acres) | Per Cent of Total Area Owned by State |
|---|---|---|---|---|---|
| Gibson | 60,339 | 37,892 | - | 37,892 | 62.8 |
| Grove | 49,866 | 38,517 | - | 38,517 | 77.2 |
| Lumber | 30,555 | 21,928 | - | 21,928 | 71.8 |
| Portage | 12,394 | 3,055 | - | 3,055 | 24.6 |
| Shippen | 97,012 | 17,594 | 11,888.2 | 29,482.2 | 30.4 |
| (Boroughs) | 714 | - | - | - | - |
| County Total | 250,880 | 118,986 | 11,888.2 | 130,874.2 | 52.2 |

The State owned land is confined almost entirely to mountain areas and is used for forestry and recreational purposes. This will be discussed in more detail in the chapter on Land Use.

## POPULATION

The first census of Cameron County listed the population in 1870 at 4,273. After 1870 the population increased to a peak of 7,644 in 1910. Since 1910 it has steadily declined to 5,307 in 1930, a 30.6 per cent decrease.

Table 2 shows the distribution and trend of the population over a twenty year period. Over 55 per cent of the total population of the County was located in the borough of Emporium in 1930. Nearly 20 per cent had residence in Shippen Township and a large portion of this group lived in the vicinity of Emporium. Five per cent were in Driftwood Borough and the remaining 20 per cent were scattered in the four other townships.

- TABLE 2 -

POPULATION OF CAMERON COUNTY (U. S. CENSUS)

| BOROUGH AND TOWNSHIP | 1930 | | 1920 | | 1910 | |
|---|---|---|---|---|---|---|
| | Population | Per Cent of Total | Population | Per Cent of Total | Population | Per Cent of Total |
| Driftwood Boro. | 282 | 5.3 | 478 | 7.6 | 517 | 6.8 |
| Emporium Boro. | 2,929 | 55.2 | 3,036 | 48.2 | 2,916 | 38.1 |
| Gibson Twp. | 374 | 7.0 | 539 | 8.6 | 1,075 | 14.1 |
| Grove Twp. | 380 | 7.2 | 489 | 7.8 | 673 | 8.8 |
| Lumber Twp. | 255 | 4.8 | 414 | 6.6 | 654 | 8.6 |
| Portage Twp. | 73 | 1.4 | 69 | 1.0 | 143 | 1.8 |
| Shippen Twp. | 1,014 | 19.1 | 1,272 | 20.2 | 1,666 | 21.8 |
| County Total | 5,307 | 100.0 | 6,297 | 100.0 | 7,644 | 100.0 |

Although Emporium has remained stationary in population, it is increasing in importance in the County. The Borough contained only 38.1 per cent of the County population in 1910 but had increased to 55.2 per cent by 1930. The population of the remaining borough and townships, with the possible exception of Portage, has been declining steadily during the twenty year period. It is in these areas of declining population that most of the problems discussed in this report occur. The cost of furnishing governmental services is not decreasing proportionately to the decrease in population and thus the governmental services are furnished to the diminishing remainder of residents at a steadily increasing cost per capita.

With the steady decline in population the density of the rural districts has become extremely low. While the acquisition of land by the State tends to concentrate the population in the areas remaining in private ownership, the density in these areas still remains relatively low when compared to the average for second class townships of the State, as shown by Table 3 and footnote:

- TABLE 3 -

POPULATION DENSITY OF TOWNSHIPS IN CAMERON COUNTY - 1930

| TOWNSHIP | Total Area (Sq. miles) | Population 1930 | Density per sq. mile | Area Excluding State Owned Land | Density Excluding State Owned Land |
|---|---|---|---|---|---|
| Gibson | 94.3 | 374 | 4.0 | 35.1 | 10.7 |
| Grove | 77.9 | 380 | 4.9 | 17.7 | 21.5 |
| Lumber | 47.7 | 255 | 5.3 | 13.5 | 18.9 |
| Portage | 19.4 | 73 | 3.8 | 14.6 | 5.0 |
| Shippen | 151.6 | 1,014 | 6.7 | 105.5 | 9.6 |
| Total | 390.9 | 2,096 | 5.4 | 186.4 | 11.2 |

Note: Average density per square mile of 2nd Class Townships in the State 52.9 - Excluding State owned land 57.2.

Since population density for townships is computed as including the small clusters of people living in unincorporated communities such as Sinnemahoning, Cameron and Sterling Run, the density of the strictly rural areas is much less than Table 3 would indicate. By referring to Figure I it will be seen that a large portion of the remaining township population resides on thin fingers of land along the streams between tracts of State owned land.

The 1930 census figures show that the sexes were evenly divided, with 2,675 male and 2,632 female residents in the County. There were 3,045 persons twenty-one years of age or over. The rural farm population numbered 830. The foreign born white population amounted to 352. There were only 21 negroes, of which 20 resided in Emporium.

No increase in population for the County as a whole is anticipated. Whether or not the decrease will continue depends on industrial activity in Emporium. If industrial growth takes place there, it may offset the probable continued decrease in the townships, and may possibly cause the County's population at least to remain stationary.

## INDUSTRY

The first settlers in the territory now comprising Cameron County were primarily home seekers. The mountainous and heavily wooded character of the area made the clearing of the land a slow process and retarded extensive agricultural development.

The first activity that could be classed as industry, other than that necessary for local requirements, was the construction of lumber rafts during the winter season. These were floated down the streams in the spring to Big Island, near Lock Haven, and traded for supplies. Except for these rather limited and individual enterprises, the first lumbering of any importance was started in the winter of 1846-47.

The business of floating logs in quantity began about 1849 and from a small beginning it grew until millions of feet of lumber floated downstream each year. Large lumber companies were chartered and large scale operations developed. Numerous saw mills opened in various parts of the County and labor was in demand. The lumber industry flourished until early in the twentieth century, although it had begun to decline during the 1890's. During the decline a number of people turned to agriculture with relatively little success.

Mineral industry began with the organization of coal companies in 1864. The bituminous coal produced was consumed locally. Known deposits are not numerous and the production always has been and is at present very small. In 1935 there were two mines employing 8 workers. The production amounted to only 3,791 tons.

Iron and gas development started in conjunction with the coal industry. The gas development was of less importance than that of iron for the first years, but neither gained much prominence by their production or employment of workers. At the present time there is a small production of natural gas.

The deposits of clay and stone were worked to some extent. At the present, however, there is very little production of these materials. Flagstone from this locality was used for walks in the esplanade at the Tomb of the Unknown Soldier, Arlington Cemetery, Virginia.

The railroad offered employment to numerous workers for many years in Driftwood, but now this activity for the most part has been transferred elsewhere. Railroads offered employment to only 26 persons during 1936 in Emporium.

During the World War period, munition plants were located near Emporium. Ideal sites were afforded by the deep ravines. In 1933 there were still two plants employing a total of 84 people, but by 1936 only 1 plant employing 31 people remained.

The leather tanning industry afforded employment to numerous persons. The abundance of hemlock, the bark of which is used in the tanning process, made this an ideal location. Plants were located in Emporium and vicinity. Employment in this industry has remained stationary for the past few years. In 1936 there was one plant employing 83 persons.

The major industry of the County at the present is the manufacturing of radio tubes, light bulbs, and similar products by the Hygrade Sylvania Corporation located in Emporium. This enterprise has grown

rapidly in the past few years, increasing from 106 employees in 1927 to 1723 in 1936. Over two-thirds of the total employees in this plant are females.

In summary: Lumbering was once the chief occupation and the main cause for the settlement of the County. After the decline of lumbering, many of the people formerly engaged in this type of industry turned to agriculture. A few were employed by the few smaller miscellaneous industries in the County. Mining and quarrying have remained relatively unimportant because of the isolated location of the County with respect to markets and the limited amount of known deposits. Manufacturing has been increasing the past two decades, but it is centered exclusively in Emporium. Unless the rural residents obtain positions in the borough and commute to and from their homes, there is very little for them to do other than to engage in agriculture. Some may work on the highways or operate small businesses, such as gasoline stations.

The State now owns most of the forests in the County and since they are in an immature stage of growth, any revival of the lumbering industry will only occur in the distant future. Even though revived, it is assumed that it will be well regulated and supervised by the State and cutting will be gradual, affording work for only a limited number of people. Barring industrial disturbances and unforeseen happenings, manufacturing should continue to furnish employment to workers in the Emporium area on at least the same scale as at present.

# LAND USE

## SCOPE AND METHOD OF STUDY

One hundred fifty-nine of the 199 Cameron County farms listed in the 1935 Census of Agriculture were visited in order to obtain information for an analysis of Agriculture. Attempt was made to contact every family that derived a major portion of its income from farming. However, if that family had only a cow, a few hens, or a garden, a detailed record was not obtained. All of the roads of the County were traveled and the names of farmers visited were listed in place on a map. The County Agricultural Agent was then interviewed to obtain the names of those overlooked during the first field investigation. Approximately 100 land utilization records were obtained in sufficient detail for analysis. Notes were taken on remaining farms, to complete the land use picture. Summaries of these data were made by townships, so that comparisons could be made.

Such additional sources of information as soil reports, agricultural economics bulletins, climatological reports, Census of Agriculture, etc. were searched for pertinent data. The County Agent, faculty members of the College of Agriculture, other State employees, and local residents were interviewed to secure information and opinions. The analysis of these data is presented prior to that of the information obtained from the field investigations in order to give a background for such discussion.

## PHYSICAL AND ECONOMIC CHARACTERISTICS

### History of Agriculture

The first white settlers located in the County as early as 1804, but it was not until many years later that any important development took place. As early as 1811, the Griffith and Coxe Land Company encouraged settlement by granting tracts of eight acres in Rich Valley, with contiguous grants of 50 acres outside the valley. Much of the land was owned by the Holland and other large companies, and although record is lacking, there is reason to believe that other companies also granted settlers free tracts of land.

Farming developed but slowly. The timber was felt to be more valuable than the land. Some attempts were made to clear land for agriculture, but the more customary procedure seems to have been that agriculture was attempted after the forest resources had been removed. The first agricultural society was organized in 1876, but it was not until over 20 years later that the County reached its peak in number of farms and amount of land in farms. By and large, the persons that farmed were not farmers by birth and experience. Many were former lumberjacks or miners. Nor did these persons farm to the exclusion of other employment; the subsistence obtained from the soil was supplemented by what work could be obtained elsewhere. Much these same conditions exist today, but now more persons are dependent on farming alone as a means of livelihood. This type of development is quite characteristic of the Counties of the Allegheny Plateau.

The peculiar relationship between the past and the present is

clearly to be seen. The physical and economic endowments of the County were more favorable to the development of various other types of industry than to that of agriculture. Farming seemingly has developed haphazardly rather than with a definite relationship to industries. In the future, such areas will need to pay more attention to those relationships. In the days of a self-sufficing economy, people were content to accept what the land offered. With the shift to a competitive exchange economy came a growing unwillingness among individuals to labor under serious handicaps. That shift itself is a significant part of the explanation of the status of agriculture today. Competition from other areas has also had serious effect, and that competition will not only continue, but will assume even greater influence.

## Climate

The growing season in Cameron County varies from 100 to 160 days. It averages two weeks longer than that at St. Marys (Elk County), and two weeks shorter than that at Williamsport (Lycoming County). The average date of the last killing frost in Cameron County is May 25, and that for the first Fall frost is September 15. In the lower valleys the season is longer than that on the upland plateaus. Length of season definitely limits the kind of crops that can be grown. Even the early maturing varieties of corn will not always mature.

The winters are long and cold. Residents report that the roads are sometimes impassable in the back sections for as much as six months of the year. The mean winter temperature is 20 degrees Fahrenheit, but extremes of minus 40 degrees are not unknown. The summers are cool. The mean summer temperature is 65 degrees Fahrenheit.

Precipitation varies from 35 to 50 inches per year, of which an average of 32 inches falls during the growing season. Rainfall is normally sufficient to insure crop production, but droughts sometimes have drastic effect on crop yields. The County is subject to floods. The narrow streams, the narrow valleys with steep valley walls, and the fact that the population is concentrated in these valleys, particularly encourage flood damage. The Indians had a tradition that the floods came periodically every 14 years, but this is more legend than fact. The last serious flood occurred in 1936.

## Soils

Detailed information on types, extent, and characteristics of Cameron County soils is not available. Since only a reconnaissance soil study has been completed, use capabilities and adaptions can only be discussed in generalities.

Approximately 35 per cent of the land area is classified as rough stony land. Slope and the amount of stone prevents production of crops. Most of this land is at present in forests and that is the use to which it is adapted. The Department of Forests and Waters has purchased thousands of acres of rough stony land at an average price of less than $3.00 per acre.

Dekalb and Gilpin are the two main soil series. These differ from the rough stony land chiefly in the degree of slope and the amount of stone. Dekalb occupies approximately 35 and Gilpin 25 per cent of the land area. Both are acid and require liming to insure and maintain crop production. Only the more level areas can be cropped. Practice has shown that the inherent productive capacity is limited, and that the

soils are better adapted to forest than to agricultural use. The farms on Dekalb and Gilpin soils are gradually being abandoned and are slowly reverting to forest. The State is encouraging this movement by continued purchases for forestry purposes.

The bottom-land, alluvial soils constitute 5 per cent of the land area. Here abandonment progresses much more slowly than is the case out on the plateaus. Some of these soils can produce good crops when properly managed, but the area of such production is not great enough to give the County a high average crop yield per acre. The greater part of the bottom-land soils are underlain with gravel at a depth of about three feet. This naturally influences their use; the lower portions are seeped; the water holding capacity is low; leaching is a problem. However, the best farms of the County are located on these soils. There, by dint of hard work and careful management, farmers can make a living, although it is also true that such individuals have many natural handicaps to overcome.

Summary of Census and Other Data

The number of acres of land in farms for the County as a whole decreased from 20,951 acres in 1930 to 19,081 acres in 1935. During the same period the number of acres of cropland harvested increased nearly 700 acres. Thus while certain lands were taken out of farms, individual farmers planted more crop acres. The percentage distribution of farm land uses gives a clearer picture of types of use than do the census acreage figures. (See Table 4). Over 67 per cent of the lands in farms were devoted to pasture and woodland. Roughly only one-fourth of the land is

cropped, and of this amount, over 10 per cent lay idle or fallow in 1935.

Analyses of data from the 1935 Census of Agriculture indicates that hay is the major crop and is followed by corn, oats, potatoes, and buckwheat in the order named. There was an average of one horse, four cattle (two of which were milk cows), and sixty chickens per farm. Thirteen farms reported a total of 464 sheep. Less than half of the farms (76) reported a total of 196 swine -- an average of one for all farms, but only four farms reported sows and gilts bred.

- TABLE 4 -

DISTRIBUTION OF FARM LAND USES, CAMERON COUNTY, 1930 and 1935 - U.S. Census

| Use | 1930 | 1935 |
|---|---|---|
| | Per Cent | Per Cent |
| Cropland | 24.0 | 31.4 |
| Harvested | 14.9 | 19.9 |
| Failure | 1.1 | 0.6 |
| Idle or Fallow | 8.0 | 10.9 |
| Pasture | 41.1 | 25.5 |
| Plowable | 7.6 | 14.3 |
| Woodland | 28.3 | 8.9 |
| Other | 5.2 | 2.3 |
| Woodland - not pastured | 31.3 | 41.5 |
| All other land in farms | 3.6 | 1.6 |

Less than 10 per cent of the farms and less than 1,500 acres of farm land were tenant operated in 1935. Further data are not included here because of the relative insignificance of tenancy. Apparently land ownership for investment purposes is none too attractive. Possibly the explanation of this relatively small amount of tenancy is the same as that

for other areas of low land values and low productivity.

Other Census data indicate that farmers worked an average of approximately 90 days per year off the farm in 1930. By 1935 this figure had dropped to 50 days per year. Possibly this is part of the explanation of the increase in farming activity since 1930 -- opportunity for other work decreased.

Data are not available by townships to show the trend in land use, but Table 5 indicates the trend for the County as a whole. No attempt is made here to explain the variation between years. State purchase is the explanation of the decrease in farm woodland.

- TABLE 5 -

TRENDS IN LAND USE, CAMERON COUNTY, 1880 to 1935-U.S. Census

| Year | Number of Farms | Acres Land in Farms | Number improved Acres | Acres Woodland |
|---|---|---|---|---|
| 1935 | 199 | 19,081 | 9,010 | 10,071 |
| 1930 | 190 | 20,951 | 7,372 | 13,579 |
| 1920 | 225 | 26,456 | 8,852 | 17,604 |
| 1910 | 328 | 34,748 | 10,869 | 23,879 |
| 1900 | 387 | 40,817 | 12,671 | 28,146 |
| 1890 | 339 | 30,924 | 12,413 | 18,511 |
| 1880 | 244 | 39,246 | 9,786 | 29,460 |

Table 6 gives an indication of the relative importance of agriculture by showing indices of productivity. The State averages in 1929 were used as 100 and the figures for Cameron County are in terms of percentages of those averages. Although the weighted crop yield varies from 74.4 to 98 per cent of the State average, crop productivity ranges from 21.1 to 39.5 per cent of the State average. The crop yield index considers the only yield per acre of the six major crops, but the productivity

index also considers the amount of work required to produce those crops, and the basis of computation is all land in farms instead of crop acres. Thus the index of productivity is a much more inclusive measure of agricultural activity than is the crop yield index. Cameron County ranks low in comparison to the average for the State. The same is true for the index of farm returns per acre of farm land and for the index of farm returns per farm. The County has less than half as high a rating as that for the State as a whole. The index of farm returns per acre of farm land is low because so many acres of farm land in this County are either idle, fallow, or are in woods.

- TABLE 6 -

FACTORS INDICATING THE RELATIVE PRODUCTIVITY OF AGRICULTURAL LAND IN CAMERON COUNTY, BY TOWNSHIPS *

| County and Township | Per Cent of land in farms | Index numbers of agricultural production, 1929 (Pennsylvania Average - 100) | | | |
|---|---|---|---|---|---|
| | | Crop Production | | Index of Farm Returns Per Acre of Farm Land | Index of Farm Returns per Farm |
| | | Weighted Crop yield Index | Weighted Crop Productivity Index | | |
| County | 8.4 | 93.4 | 24.6 | 37.1 | 46.0 |
| Gibson | 7.7 | 98.0 | 32.2 | 32.2 | 41.0 |
| Grove | 2.8 | 87.4 | 24.2 | 28.4 | 41.3 |
| Lumber | 3.2 | 90.2 | 39.5 | 42.0 | 46.6 |
| Portage | 7.0 | 74.4 | 20.3 | 41.4 | 50.3 |
| Shippen | 13.4 | 93.8 | 21.1 | 39.1 | 47.9 |

* Bulletin 317 - Land Use in Pennsylvania by Paul I. Wrigley, May 1935. Pennsylvania State College, School of Agriculture and Experiment Station.

## ANALYSIS OF AGRICULTURAL ACTIVITY - 1936

The location of the farms visited during the field investigation is shown by Figure III. Location of the other properties classified as farms in the assessors' lists is also shown. The farming areas within the County are delimited so that comparisons can be made between areas. Shippen Township was divided into four such units, but there were not enough farms in the balance of the County to warrant subdivision of other townships. There are relatively few farms, farming areas are small in comparison to total area of the County, and activity is concentrated primarily in Shippen Township. The farming areas are located along the major streams, and in the following tables there are data for each of these areas. The discussion and the data are self-explanatory if occasional reference is made to the map.

Figure IV shows the size of farms and the proportions of the area of the farms that is cleared for agriculture. The locations are approximately correct, but no attempt is made to show actual boundaries or the exact portion of land that is cleared. Every farm for which this information could be ascertained has been included, regardless of whether or not a detailed record was obtained from that farm. In addition to what is shown in Figure III, Figure IV indicates that only relatively small proportions of farms are used for agricultural purposes.

### Farm Land Use

Averages for farms reporting have been calculated by farming areas in the following tables. Ninety-six land utilization schedules were obtained in varying degrees of completeness; the greater the activ-

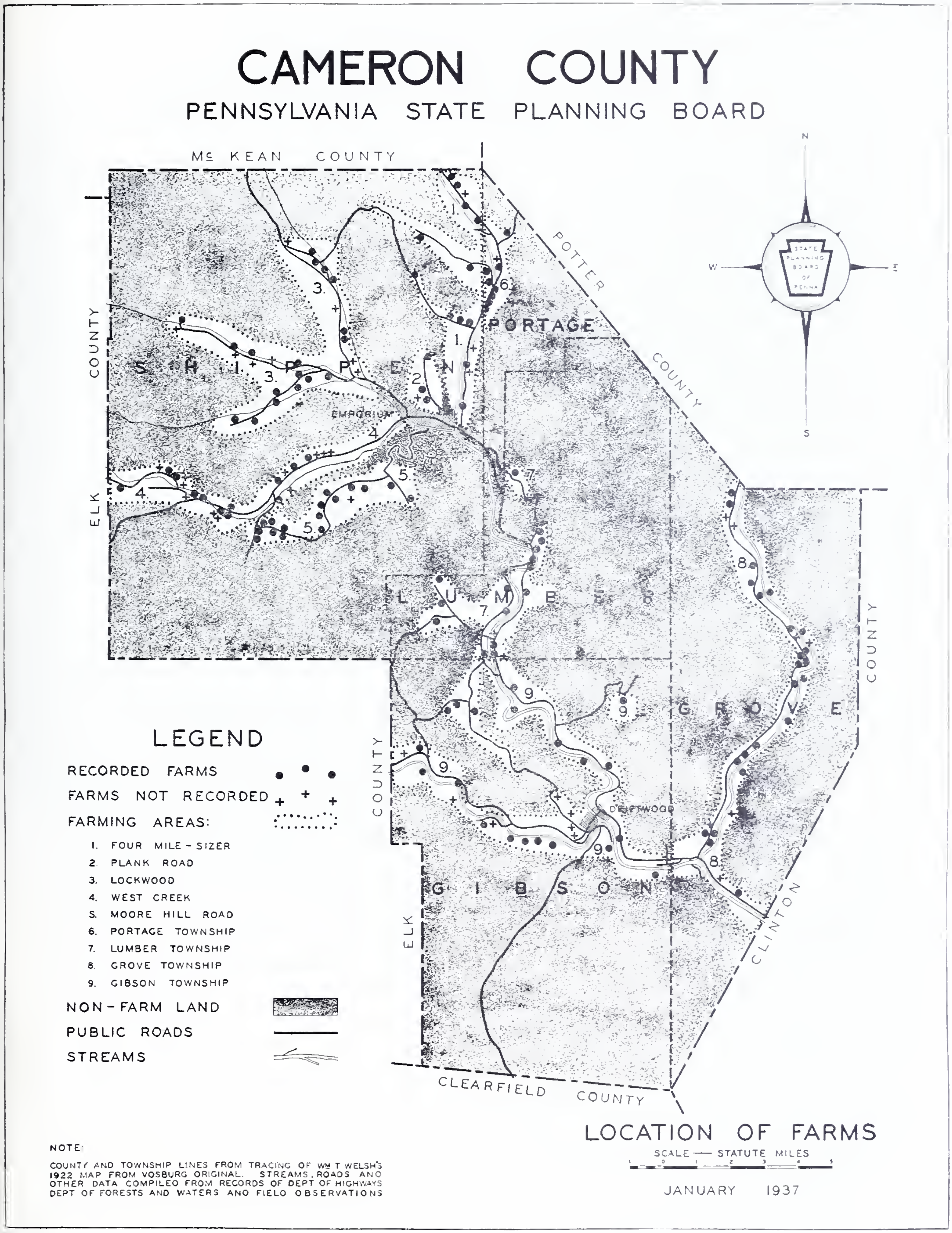
CAMERON COUNTY
PENNSYLVANIA STATE PLANNING BOARD
MC KEAN COUNTY
POTTER COUNTY
ELK COUNTY
CLINTON COUNTY
CLEARFIELD COUNTY
SHIPPEN
PORTAGE
LUMBER
GROVE
GIBSON
EMPORIUM
DRIFTWOOD
N
S
E
W
STATE PLANNING BOARD OF PENNA
LEGEND
RECORDED FARMS
FARMS NOT RECORDED
FARMING AREAS:
1. FOUR MILE - SIZER
2. PLANK ROAD
3. LOCKWOOD
4. WEST CREEK
5. MOORE HILL ROAD
6. PORTAGE TOWNSHIP
7. LUMBER TOWNSHIP
8. GROVE TOWNSHIP
9. GIBSON TOWNSHIP
NON-FARM LAND
PUBLIC ROADS
STREAMS
NOTE:
COUNTY AND TOWNSHIP LINES FROM TRACING OF WM T WELSH'S 1922 MAP FROM VOSBURG ORIGINAL. STREAMS, ROADS AND OTHER DATA COMPILED FROM RECORDS OF DEPT OF HIGHWAYS DEPT OF FORESTS AND WATERS AND FIELD OBSERVATIONS
LOCATION OF FARMS
SCALE — STATUTE MILES
JANUARY 1937

FIGURE III

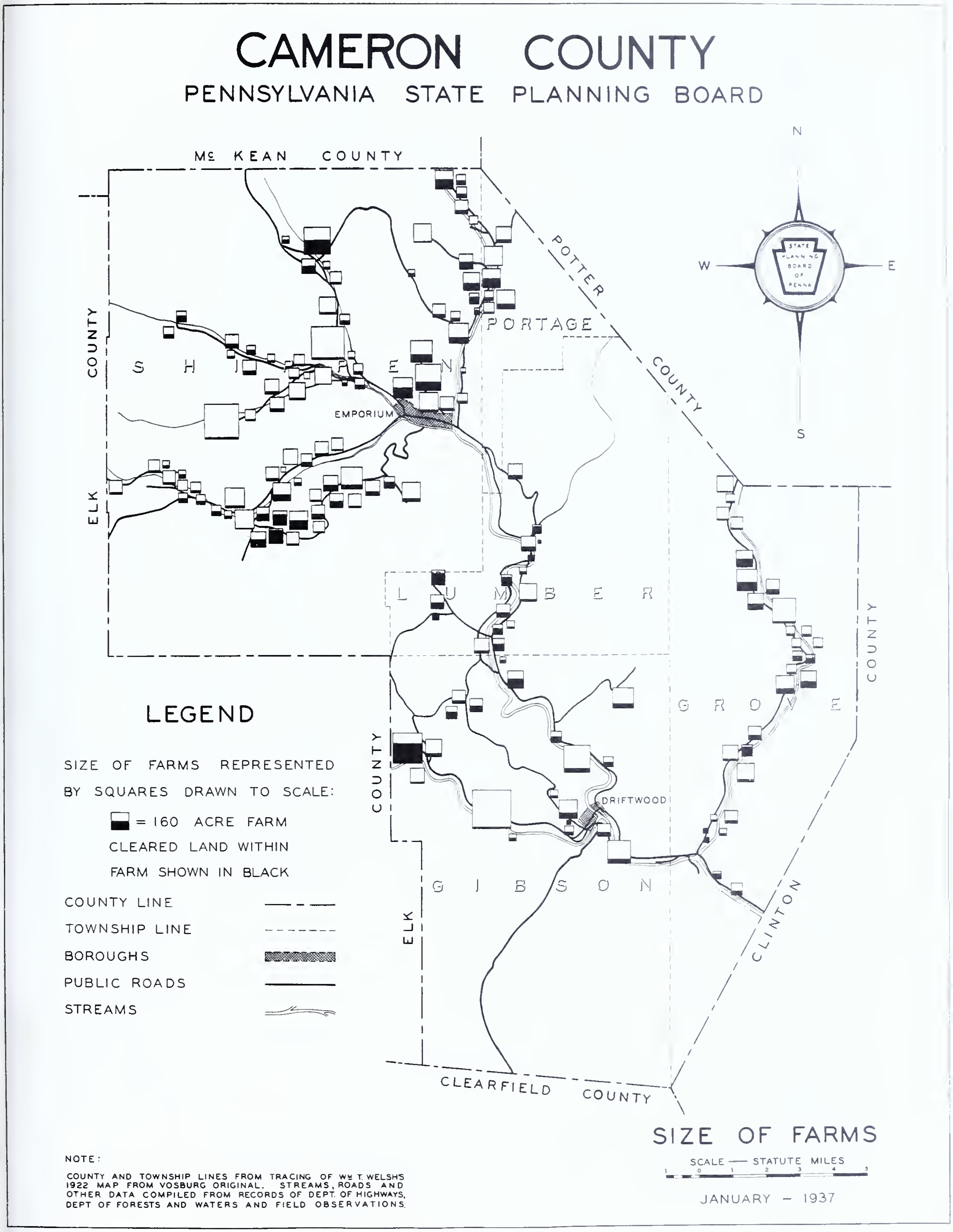
CAMERON COUNTY
PENNSYLVANIA STATE PLANNING BOARD
MC KEAN COUNTY
POTTER COUNTY
ELK COUNTY
CLEARFIELD COUNTY
CLINTON COUNTY
SHIPPEN
PORTAGE
LUMBER
GROVE
GIBSON
EMPORIUM
DRIFTWOOD
N
S
E
W
STATE PLANNING BOARD OF PENNA
LEGEND
SIZE OF FARMS REPRESENTED BY SQUARES DRAWN TO SCALE:
= 160 ACRE FARM
CLEARED LAND WITHIN FARM SHOWN IN BLACK
COUNTY LINE
TOWNSHIP LINE
BOROUGHS
PUBLIC ROADS
STREAMS
NOTE:
COUNTY AND TOWNSHIP LINES FROM TRACING OF WM. T. WELSH'S 1922 MAP FROM VOSBURG ORIGINAL. STREAMS, ROADS AND OTHER DATA COMPILED FROM RECORDS OF DEPT. OF HIGHWAYS, DEPT OF FORESTS AND WATERS AND FIELD OBSERVATIONS.
SIZE OF FARMS
SCALE — STATUTE MILES
1 0 1 2 3 4 5
JANUARY – 1937

FIGURE IV

- TABLE 7 -

AVERAGES PER FARM REPORTING FARM LAND USE IN CAMERON COUNTY - BY FARMING AREAS - 1936

| Farming Area | Land in Farms | | Land in Woods | | Land Cleared | | Land Cropped | | Per Cent of Cleared Land Cropped |
|---|---|---|---|---|---|---|---|---|---|
| | Average Per Farm (Acres) | Number Farms Reporting | Average Per Farm (Acres) | Number Farms Reporting | Average Per Farm (Acres) | Number Farms Reporting | Average Per Farm (Acres) | Number Farms Reporting | |
| Shippen Twp. | 133 | 42 | 95 | 40 | 42 | 42 | 19 | 40 | 44.1 |
| 4 Mile & Sizer | 94 | 10 | 71 | 9 | 29 | 10 | 11 | 10 | 37.8 |
| Plank Road | 270 | 3 | 172 | 3 | 98 | 3 | 48 | 3 | 49.2 |
| Lockwood | 181 | 8 | 160 | 7 | 41 | 8 | 14 | 7 | 30.9 |
| West Creek | 88 | 8 | 71 | 8 | 17 | 8 | 11 | 7 | 57.4 |
| Morehill Road | 129 | 13 | 75 | 13 | 55 | 13 | 26 | 13 | 48.1 |
| Portage Twp. | 84 | 10 | 58 | 10 | 26 | 10 | 16 | 5 | 30.7 |
| Lumber Twp. | 59 | 15 | 39 | 12 | 28 | 15 | 10 | 12 | 28.5 |
| Grove Twp. | 103 | 18 | 92 | 15 | 27 | 18 | 10 | 15 | 27.1 |
| Gibson Twp. | 213 | 11 | 170 | 11 | 43 | 11 | 23 | 11 | 52.6 |
| Cameron County | 120 | 96 | 92 | 88 | 35 | 96 | 17 | 63 | 39.9 |

Source: Field Investigations.

ity on the individual farm, the greater the detail obtained. Not all of these schedules could be used for all of the summaries, primarily because it was impossible to obtain certain data for certain farms. In essence, the calculations are averages for selected farms. These data are for the better farms of the County because those that contributed only residence or home and garden were excluded from the calculations in comparison to Census data. Approximately 60 per cent of the land in farms and the livestock on farms are included in the analyses.

The significance of Table 7 is in the lack of relationship between size of farm and number of acres of crop land, and that of crop land to cleared land. A relatively small per cent of the land in farms is cropped. Apparently, size of farm has but little to do with the number of acres of crops. Pasture is not included with crop acres.

The distribution of cropped acres per farm is shown in Table 8. The percentage of cleared land cropped is even more significant in the light of the actual number of acres devoted to crop production. Only 16.7 acres per farm produce crops, but this ranges in different areas from 11 to 48 acres. Plank Road, the best farming area of the County, has only three farms. Hay is the most important crop, comprising 12 of the 16 acres per farm. Corn, including both grain and silage, is the next most important crop; silage is the more important since grain does not always mature. These figures are for the crop year 1936 - an average crop year, since precipitation and temperature were normal. Corn, hay, wheat, oats and potatoes were the only crops of such amount as to be listed.

- TABLE 8 -

AVERAGE ACREAGE OF VARIOUS CROPS PER FARM REPORTING IN CAMERON COUNTY - BY FARMING AREAS - 1936

| Farming Area | Total Crops | | Corn For Grain | | Corn Silage | | All Hay Crops | | Wheat | | Oats | | Potatoes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ave. Acres per Farm | Number Farms Reporting | Ave. Acres per Farm | Number Farms Reporting | Ave. Acres per Farm | Number Farms Reporting | Ave. Acres per Farm | Number Farms Reporting | Ave. Acres per Farm | Number Farms Reporting | Ave. Acres per Farm | Number Farms Reporting | Ave. Acres per Farm | Number Farms Reporting |
| Shippen Twp. | 19.4 | 40 | 1.7 | 25 | 6.4 | 5 | 14.4 | 37 | 2.0 | 1 | 4.3 | 24 | 1.1 | 32 |
| 4 Mile & Sizer | 11.1 | 10 | 0.8 | 5 | 4.0 | 1 | 7.2 | 10 | - | - | 2.7 | 6 | 0.8 | 6 |
| Plank Road | 48.3 | 3 | - | - | 6.3 | 3 | 34.6 | 3 | - | - | 10.0 | 2 | 2.0 | 1 |
| Lockwood | 14.4 | 7 | 1.8 | 4 | 9.0 | 1 | 11.5 | 6 | - | - | 6.5 | 2 | 0.7 | 4 |
| West Creek | 11.1 | 7 | 1.0 | 6 | - | - | 8.3 | 7 | 2.0 | 1 | 0.8 | 5 | 0.9 | 7 |
| Morehill Road | 26.2 | 13 | 2.6 | 10 | - | - | 21.1 | 11 | - | - | 5.4 | 9 | 1.5 | 12 |
| Portage Twp. | 15.8 | 5 | 1.0 | 1 | 10.0 | 1 | 10.4 | 5 | - | - | 6.5 | 2 | 0.7 | 4 |
| Lumber Twp. | 10.1 | 12 | 1.8 | 8 | - | - | 9.6 | 9 | 1.0 | 1 | 3.0 | 3 | 0.9 | 7 |
| Grove Twp. | 10.0 | 15 | 2.2 | 9 | - | - | 8.5 | 9 | 1.0 | 1 | 3.5 | 4 | 0.7 | 11 |
| Gibson Twp. | 22.7 | 10 | 6.0 | 7 | - | - | 13.7 | 10 | 2.0 | 1 | 4.4 | 5 | 0.9 | 10 |
| Cameron County | 16.7 | 82 | 2.4 | 50 | 7.6 | 6 | 12.7 | 70 | 1.5 | 4 | 4.2 | 36 | 0.9 | 64 |

Source: Field Investigations.

- TABLE 9 -

AVERAGE NUMBER OF LIVESTOCK AND AVERAGE TOTAL ANIMAL UNITS PER FARM REPORTING

IN CAMERON COUNTY - BY FARMING AREAS - 1936

| Farming Area | Milk Cows | | Young Stock and Bulls | | Hogs | | Sheep | | Poultry | | Horses and/or Mules | | Total Animal Units | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ave. Per Farm | Number Farms Reporting | Ave. Per Farm | Number Farms Reporting | Ave. Per Farm | Number Farms Reporting | Ave. Per Farm | Number Farms Reporting | Ave. Per Farm | Number Farms Reporting | Ave. Per Farm | Number Farms Reporting | Ave. Per Farm | Number Farms Reporting |
| Shippen Twp. | 4.1 | 41 | 3.5 | 25 | 2.3 | 29 | 55.8 | 4 | 102.4 | 37 | 2.0 | 25 | 8.0 | 42 |
| 4 Mile & Sizer | 3.1 | 10 | 2.0 | 7 | 1.9 | 8 | - | - | 63.4 | 10 | 2.0 | 4 | 5.9 | 10 |
| Plank Road | 15.3 | 3 | 11.0 | 3 | 2.0 | 2 | - | - | 67.3 | 3 | 2.3 | 3 | 24.2 | 3 |
| Lockwood | 4.9 | 7 | 3.8 | 4 | 3.3 | 6 | 4.0 | 1 | 76.3 | 7 | 2.7 | 3 | 7.4 | 8 |
| West Creek | 1.8 | 8 | 2.5 | 2 | 1.5 | 4 | - | - | 246.1 | *6 | 1.4 | 5 | 4.9 | 8 |
| Morehill Road | 3.3 | 13 | 2.2 | 9 | 2.5 | 9 | 73.0 | 3 | 83.8 | 11 | 2.0 | 10 | 8.8 | 13 |
| Portage Twp. | 2.6 | 6 | 4.0 | 1 | 3.0 | 2 | - | - | 50.0 | 5 | 2.0 | 1 | 3.3 | 7 |
| Lumber Twp. | 2.3 | 12 | 1.9 | 9 | 2.8 | 7 | 12.0 | 1 | 59.9 | 12 | 1.6 | 5 | 4.1 | 13 |
| Grove Twp. | 2.5 | 11 | 2.5 | 6 | 3.0 | 6 | - | - | 54.5 | 10 | 1.6 | 5 | 4.3 | 12 |
| Gibson Twp. | 4.8 | 11 | 2.0 | 7 | 2.9 | 10 | 27.5 | 2 | 60.0 | 10 | 1.9 | 10 | 8.1 | 11 |
| Cameron County | 3.6 | 81 | 2.8 | 46 | 2.6 | 54 | 41.4 | 7 | 79.7 | 74 | 1.9 | 46 | 6.5 | 85 |

* Includes one specialized poultry farm.
Source: Field Investigations.

## Livestock Distribution

Table 9 presents the distribution per farm of the numbers of livestock and the total animal units*. Milk cows are the most important kind of livestock kept. The average herd is less than 4 cows per farm, but the range is from 1 to 22 cows. In general, the farms closer to the local markets of Emporium, Driftwood, and Sinnemahoning have more cows per farm than do those located at greater distances from the local markets. Only two farms kept beef cattle. Hogs are raised only for family consumption. Nearly every farm keeps a flock of chickens, but not over half of these flocks are kept for other than family use. There is only one specialized poultry farm in the County. Seven farms keep sheep, but the number per farm is small.

## Marketing Practices

Very little farm produce is marketed outside the County. Three farms reported milk sales (totaling approximately $160. per year) to Buffalo. All the potatoes are sold locally, to stores, to dealers at the farm, to neighbors, or are peddled in Emporium and Driftwood. Two Farmers reported the sale of lambs to Buffalo, and one shipped eggs outside the County. The exact amount of such sales is not known, but the total value is small. Emporium and Driftwood constitute the principal market.

An estimate obtained by contacting stores and milk distributors indicates that over 700 quarts of milk are brought into the County daily. This would amount to over $15,000 per year. Nearly 1,000 gallons of cream and 130,000 pounds of butter are also purchased from outside the

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* One Milk cow, one beef cow, one bull, 2 heifers, 5 hogs, 7 sheep, 14 lambs, 1 horse, or 100 hens equals 1 animal unit; thus an animal unit is used only as a convenient common-denominator for all livestock.

County yearly. These figures are not staggering, but do show that the County does not produce enough for its own needs. However, if there were two more producers with the same volume of business as the largest present producer (20 cow herd), the local milk market would be over-supplied. A number of producers have gone out of business just recently, because of the increasing health regulations, variability of the local market, and competition from other areas. Previously, more than enough milk was produced for local needs. Local demand has increased within the past two years because there are now four C.C.C. Camps, requiring 200 quarts of milk per day, but farmers cannot rely upon so indefinite a market.

A further indication that farmers are not supplying the local market is shown by the fact that approximately 500 tons of grain cow feed, 200 tons of scratch grain, and 100 tons of mash were purchased outside the County last year. This is an average of approximately 500 pounds per animal unit. The total value amounts to over $30,000 a year. Again that amount is not staggering, but it is a cash outlay that must be met with an income from some source. In this respect it is to be remembered that it is common practice in many parts of the State to purchase some of the dairy and chicken feed. The character of Pennsylvania's agriculture is such that many regions can produce roughage to support a dairy industry which requires more concentrates than can be produced. Therefore, concentrates are purchased in order to make a larger dairy industry possible. However, such practice has more effect on the individual in an area like Cameron than on the producer operating in a dairy or general type of farming area.

The local market for vegetables and potatoes is quite largely satisfied from other areas. Many farmers report that they cannot success-

- TABLE 10 -

AVERAGE INCOME FROM VARIOUS SOURCES PER FARM REPORTING AND PERCENTAGE DISTRIBUTION OF TOTAL INCOME BY SOURCES IN CAMERON COUNTY - BY TOWNSHIPS - 1936

| Earning Area | Crops | | | Livestock | | | Milk and Milk Products | | | Eggs | | | Other Live-stock Products | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Income | | | Income | | | Income | | | Income | | | Income | | |
| | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting |
| Shippen Twp. | $131 | 2.6 | 14 | $214 | 6.8 | 22 | $3513 | 55.3 | 11 | $478 | 8.2 | 12 | $331 | 3.3 | 7 |
| Portage Twp. | 50 | 1.2 | 1 | 45 | 3.2 | 3 | 1464 | 34.2 | 1 | 15 | 0.3 | 1 | | | |
| Lumber Twp. | 90 | 4.7 | 5 | 38 | 2.8 | 7 | 365 | 3.8 | 1 | 46 | 1.4 | 3 | 102 | 2.2 | 2 |
| Grove Twp. | 38 | 1.4 | 2 | 54 | 7.1 | 7 | 40 | 1.5 | 2 | 130 | 2.4 | 1 | | | |
| Gibson Twp. | 191 | 5.6 | 4 | 84 | 3.7 | 6 | 1343 | 49.2 | 5 | 36 | 0.6 | 2 | 82 | 1.2 | 2 |
| Cameron County | 123 | 3.1 | 26 | 133 | 5.9 | 45 | 2364 | 46.0 | 20 | 321 | 5.9 | 19 | 244 | 2.6 | 11 |

| Earning Area | Lumber | | | Team Labor off Farm | | | Other Labor off Farm | | | Hunters and Boarders | | | Total Income | | | Cash Farm Income | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Income | | | Income | | | Income | | | Income | | | Income | | | | |
| | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | Per Cent of Total* | No. Farms Reporting | Ave. Per Farm | No. Farms Reporting |
| Shippen Twp. | $215 | 0.3 | 1 | $ | | | $620 | 21.6 | 25 | $450 | 1.9 | 3 | $2068 | 100.0 | 34 | $1844 | 29 |
| Portage Twp. | | | | | | | 873 | 61.1 | 3 | | | | 612 | 100.0 | 7 | 416 | 4 |
| Lumber Twp. | | | | 183 | 6.8 | 3 | 549 | 74.9 | 13 | 420 | 4.4 | 1 | 681 | 100.0 | 14 | 247 | 8 |
| Grove Twp. | | | | | | | 388 | 87.1 | 12 | 25 | 0.5 | 1 | 412 | 100.0 | 13 | 95 | 7 |
| Gibson Twp. | 15 | 0.1 | 1 | 127 | 2.8 | 3 | 689 | 30.3 | 6 | 223 | 6.5 | 4 | 1515 | 100.0 | 9 | 1077 | 8 |
| Cameron County | 115 | 0.2 | 2 | 155 | 0.9 | 6 | 577 | 32.8 | 59 | 298 | 2.6 | 9 | 1339 | 100.0 | 77 | 1186 | 56 |

* Percentage distribution of the total income was computed by using the total income (average per farm X number of farms reporting) from each source for each earning area.

Note: Oata is not shown by area in Shippen Township for number reporting is so small that to do so would be a violation of confidence promised when the information was obtained.

fully compete with other portions of the State in the production of these and other products for the local or for an outside market.

## Family Income and Expenditures

Table 10 shows the distribution of income from various sources. Note that more farms reported income from non-farm labor than from any

- TABLE 11 -

AVERAGE CASH EXPENDITURES FOR VARIOUS ITEMS PER FARM REPORTING IN CAMERON COUNTY - BY FARMING AREAS - 1936

| Farming Area | Hired Labor | | Equip. Pur-chases and Rep. | | Bldgs. and Bldg. Repair | | Insur-ance | | Seed | | Feed | | Ferti-lizer and Lime | | Live-stock Pur-chases | | Miscel-laneous* | | Total Farm Cash Expenses | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. | Ave. Per Farm | No. Farms Rptg. |
| Shippen Twp. | $238 | 11 | $104 | 16 | $ 62 | 16 | $19 | 19 | $25 | 20 | $ 461 | 24 | $39 | 16 | $ 93 | 14 | $379 | 14 | $ 444 | 28 |
| 4 Mile & Sizer | 148 | 4 | 43 | 3 | 63 | 5 | 23 | 6 | 24 | 5 | 282 | 6 | 49 | 4 | 38 | 7 | 34 | 4 | 494 | 8 |
| Plank Road | 287 | 3 | 27 | 3 | 88 | 2 | 34 | 2 | 47 | 3 | 1058 | 3 | 68 | 3 | 15 | 1 | 850 | 3 | 2634 | 3 |
| Lockwood | 540 | 2 | 1235 | 1 | 25 | 1 | 4 | 1 | 33 | 2 | 509 | 4 | 41 | 2 | 253 | 4 | 723 | 3 | 1284 | 6 |
| West Creek | - | - | 5 | 1 | 25 | 2 | 15 | 2 | 10 | 2 | 1175 | 2 | 15 | 1 | - | - | 50 | 1 | 1260 | 2 |
| Morehill Road | 43 | 2 | 27 | 8 | 70 | 6 | 16 | 8 | 19 | 8 | 203 | 9 | 22 | 6 | 7 | 2 | 134 | 3 | 374 | 9 |
| Portage Twp. | 38 | 2 | 70 | 1 | - | - | 75 | 1 | 30 | 1 | 75 | 2 | 45 | 1 | 8 | 2 | - | - | 230 | 2 |
| Lumber Twp. | 10 | 1 | 19 | 3 | 24 | 3 | 10 | 1 | 16 | 4 | 103 | 6 | 28 | 1 | 68 | 5 | 5 | 2 | 172 | 7 |
| Grove Twp. | 15 | 3 | 9 | 4 | 34 | 4 | 6 | 1 | 24 | 5 | 80 | 5 | 15 | 3 | 29 | 3 | 25 | 5 | 100 | 10 |
| Gibson Twp. | 78 | 3 | 58 | 6 | 117 | 5 | 24 | 4 | 37 | 6 | 267 | 6 | 63 | 5 | 125 | 5 | 19 | 4 | 512 | 8 |
| Cameron County | 149 | 20 | 72 | 30 | 64 | 28 | 21 | 26 | 26 | 36 | 322 | 43 | 41 | 26 | 82 | 29 | 221 | 25 | 568 | 55 |

* Includes Milk purchases, threshing, silo filling, milk hauling, machinery hired, etc.
Source: Field Investigations.

source on the farm. Milk and its products constituted the major source of farm income. The average milk and milk product sales per farm appear to be very high, but it is to be remembered that within this small group are a few cases with incomes much above the County's average. Very few crops are sold. The main cash crop is potatoes. The chief significance of these data is in the relatively small amounts per farm from the various sources. The discrepancy between number of farms reporting total income and number reporting cash farm income is to be explained by the manner in which the averages were calculated (per farm average for farms reporting) and also the fact that non-farm incomes were reported in some instances in which there were no farm incomes.

The percentage distribution of income from various sources (Table 10) bears out the statements made previously that dairying is the main farm enterprise. There is a single instance of a farming area in Shippen Township in which eggs are over 40 per cent of the income, but this is accounted for by the presence of one specialized poultry farm. Labor off the farm accounts for a third of the family income for the County as a whole, but in some parts, over 85 per cent of the income comes from non-farm sources.

Table 11 shows the average cash expenditures per farm reporting various farm expenses. Feed is the largest single item of expense, which adds emphasis to the statements made about the amount of feed purchased by farmers. Most of this feed is used for dairy cattle and for poultry. Labor is the next most important item of expense, since dairying, which naturally requires a great amount of labor, is the most important farm enterprise. The other expenses are not of major significance except that

fertilizer and lime amounts to but little per farm, yet the operators report that little can be grown without the application of lime and fertilizer.

Cash income, expenditures and non-farm income are shown for 50 farms in Table 12. The significance of these figures is in the large number of low or minus farm incomes. Farmers were either forced to outside work, or possibly the work off the farm constituted the major interest and farming was only incidental to help cut down the cost of living. Some families sacrificed in standard of living. These are in the best farms of the County, but only 11 of them had a cash income from farming of $1,000 or over, and only 6 had an income larger than $2,000. On 30 of the farms listed in Table 12 the non-farm income equals or exceeds the balance left when expenses are subtracted from receipts, and in most of the remaining cases the non-farm income is a major contribution to the family living.

Labor incomes for 26 of the farms of the County are shown in Table 13. Only 13 farms had labor incomes of over $1,000 even when non-farm income is included, but only 8 farms had labor incomes of $1,000 or over when non-farm income is excluded.

Labor income is the amount the individual has in return for his labor. It is the balance left when all farm expenses are paid and allowance is made for change in inventory and interest on investment. These figures are not complete cost analyses, and are not strictly correct from a purely farm management point of view, because the type of field schedule used was not designed to obtain the data necessary for scientific labor income calculations. However, they are accurate enough to serve the purpose of showing the general range of labor incomes on the best farms in the County.

- TABLE 12 -

CASH INCOMES AND CASH EXPENDITURES ON 50

SELECTED CAMERON COUNTY FARMS - 1936

| Farm No. | Cash Farm Receipts | Cash Farm Expense | Cash Receipts Less Cash Expense | Non-Farm Income | Farm No. | Cash Farm Receipts | Cash Farm Expense | Cash Receipts Less Cash Expense | Non-Farm Income |
|---|---|---|---|---|---|---|---|---|---|
| 1 | $ 47 | $ 479 | $- 432 | $1,825 | 26 | $ 145 | $ 311 | $- 166 | $1,200 |
| 2 | 5,051 | 2,768 | 2,283 | - | 27 | 71 | 106 | - 35 | 1,795 |
| 3 | 151 | 253 | - 102 | 480 | 28 | 731 | 910 | - 179 | 300 |
| 4 | 5,278 | 2,145 | 3,133 | 200 | 29 | 4,078 | 1,380 | 2,698 | 400 |
| 5 | 45 | 507 | - 462 | 896 | 30 | 172 | 389 | - 217 | 150 |
| 6 | 106 | 286 | - 180 | - | 31 | - | 332 | - 332 | 1,715 |
| 7 | 906 | 420 | 486 | 700 | 32 | 2,912 | 687 | 2,225 | 580 |
| 8 | 25 | 170 | - 145 | 800 | 33 | 120 | 297 | - 177 | 165 |
| 9 | 2,792 | 1,520 | 1,272 | - | 34 | 493 | 203 | 290 | 130 |
| 10 | 410 | 195 | 215 | 95 | 35 | 250 | 100 | 150 | 200 |
| 11 | 885 | 855 | 30 | 1,485 | 36 | 195 | 418 | - 223 | 340 |
| 12 | 1,015 | 709 | 306 | 100 | 37 | 209 | 110 | 99 | 680 |
| 13 | 1,508 | 375 | 1,133 | 425 | 38 | 100 | 162 | - 62 | 720 |
| 14 | 316 | 115 | 201 | 620 | 39 | 135 | 208 | - 73 | 400 |
| 15 | 674 | 480 | 194 | - | 40 | - | 110 | - 100 | 1,000 |
| 16 | 580 | 291 | 289 | 441 | 41 | - | 20 | - 20 | - |
| 17 | 11,826 | 6,119 | 5,707 | - | 42 | 143 | 214 | - 71 | 205 |
| 18 | 1,558 | 145 | 1,413 | 675 | 43 | 251 | 100 | 151 | 240 |
| 19 | 313 | 398 | - 85 | 200 | 44 | 24 | 64 | - 40 | 550 |
| 20 | 2,423 | 916 | 1,507 | 48 | 45 | - | 77 | - 77 | 360 |
| 21 | 50 | 252 | - 202 | 1,160 | 46 | 35 | 35 | - | - |
| 22 | 455 | 238 | 223 | 540 | 47 | 125 | 265 | - 140 | 180 |
| 23 | 20 | 128 | - 108 | 80 | 48 | - | 103 | - 103 | 50 |
| 24 | 14,896 | 9,045 | 5,851 | - | 49 | 1,480 | 382 | 1,098 | - |
| 25 | - | 100 | - 100 | 960 | 50 | - | 78 | - 78 | - |

Source: Field Investigations

- TABLE 13 -

LABOR INCOME AND RELATED DATA ON 26 CAMERON COUNTY FARMS - 1936

| Farm No. | Non-Farm Income | Gross Cash Family Receipts | Cash Farm Expense | Change in Inventory | Interest on Investment | Labor Income |
|---|---|---|---|---|---|---|
| 1 | $ 200 | $ 513 | $ 398 | $105 | $143 | $ 77 |
| 2 | 540 | 995 | 238 | - 30 | 170 | 557 |
| 3 | 675 | 2,233 | 145 | -355 | 210 | 1,523 |
| 4 | 1,485 | 2,370 | 855 | 103 | 136 | 1,492 |
| 5 | 700 | 1,606 | 420 | -716 | 276 | 194 |
| 6 | 95 | 505 | 195 | -135 | 92 | 83 |
| 7 | 100 | 1,115 | 709 | - 15 | 99 | 292 |
| 8 | 620 | 936 | 115 | 40 | 180 | 561 |
| 9 | 441 | 1,021 | 291 | - 65 | 89 | 576 |
| 10 | 1,715 | 1,715 | 332 | 75 | 284 | 1,174 |
| 11 | 580 | 3,492 | 687 | -260 | 200 | 2,345 |
| 12 | 1,795 | 1,866 | 106 | 65 | 102 | 1,723 |
| 13 | 150 | 322 | 389 | -170 | 117 | -354 |
| 14 | 300 | 1,031 | 910 | -240 | 309 | -428 |
| 15 | 130 | 623 | 203 | - 60 | 156 | 204 |
| 16 | 425 | 1,933 | 375 | - | 108 | 1,450 |
| 17 | 200 | 5,478 | 2,145 | -270 | 192 | 2,871 |
| 18 | - | 11,826 | 6,119 | -355 | 320 | 5,032 |
| 19 | - | 5,051 | 2,768 | -335 | 572 | 1,376 |
| 20 | 48 | 2,471 | 916 | -160 | 338 | 1,057 |
| 21 | 896 | 941 | 507 | -105 | 168 | 161 |
| 22 | - | 2,792 | 1,520 | - 95 | 362 | 815 |
| 23 | 1,825 | 1,872 | 479 | 20 | 115 | 1,298 |
| 24 | - | 14,896 | 9,045 | 422 | 660 | 5,613 |
| 25 | - | 1,480 | 382 | - 20 | 316 | 762 |
| 26 | 400 | 4,478 | 1,380 | 240 | 387 | 2,951 |

Source: Field Investigations

If the non-farm incomes are subtracted from the labor incomes (see first and last columns - Table 13) then only 4 farms have farm labor incomes of $2,000 or over, 4 have between $1,000 and $2,000, 3 have between $500 and $1,000, 5 have between $1.00 and $500.00, and 10 are minus figures. Thus, roughly one in every 15 of the farms visited furnishes the operator a farm labor income of more than $500. per year. This indicates an important relationship between farm and non-farm income. The development of part-time farms has been a natural and a practical step. Natural physical handicaps have prevented wide-spread development of commercial farming. In many instances the individual has found it to his advantage to accept work off the farm rather than to expend the same or more energy in the production processes on his own farm. Part-time farming will continue to characterize Cameron County agriculture. As time goes on there will again be opportunity for work in the forests. The combination of farm and forest work offers possibilities deserving careful examination. It is not expected that the number of farms will increase, for the amount of lucrative non-farm employment has definite limits, but more of the existing farms will no doubt be operated on a part-time basis. Forestry is particularly advantageous in this respect for the seasons of work do not seriously interfere with agricultural occupations.

Some of the data in the previous tables might be interpreted to mean that agricultural production is profitable. Some of the farms and some of the areas have quite high incomes. However, in most cases the high income is associated with favorable location with respect to market, or with the combination of the farm with an outside enterprise such as a retail milk delivery route. It is to be emphasized that these data are taken from the

- TABLE 14 -

AVERAGE PRODUCTIVE MAN WORK UNITS PER FARM REPORTING VARIOUS ENTERPRISES

CAMERON COUNTY - BY FARMING AREAS - 1936

| Farming Area | Milk Cows | | Sheep | | Hogs | | Poultry | | Horses | | All Field Crops | | All live-stock | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ave. PMWU* | No. Farms Rptg. | Ave. PMWU* | No. Farms Rptg. | Ave. PMWU* | No. Farms Rptg. | Ave. PMWU* | No. Farms Rptg. | Ave. PMWU* | No. Farms Rptg. | Ave. PMWU* | No. Farms Rptg. | Ave. PMWU* | No. Farms Rptg. | Ave. PMWU* | No. Farms Rptg. |
| Shippen Twp. | 92 | 41 | 17 | 4 | 3 | 29 | 18 | 37 | 24 | 24 | 38 | 42 | 119 | 44 | 148 | 50 |
| 4 Mile & Sizer | 63 | 10 | - | - | 2 | 8 | 9 | 10 | 24 | 4 | 23 | 10 | 83 | 10 | 106 | 10 |
| Plank Road | 359 | 3 | - | - | 2 | 2 | 10 | 3 | 28 | 3 | 92 | 3 | 398 | 3 | 490 | 3 |
| Lockwood | 135 | 7 | 2 | 1 | 4 | 6 | 18 | 7 | 30 | 2 | 30 | 7 | 145 | 8 | 171 | 8 |
| West Creek | 42 | 8 | - | - | 3 | 4 | 42 | 6 | 17 | 5 | 19 | 9 | 75 | 10 | 84 | 11 |
| Morehill Road | 96 | 13 | 22 | 3 | 4 | 9 | 14 | 11 | 24 | 10 | 53 | 13 | 133 | 13 | 172 | 13 |
| Portage Twp. | 67 | 6 | - | - | 4 | 2 | 8 | 5 | 24 | 1 | 34 | 5 | 67 | 7 | 91 | 7 |
| Lumber Twp. | 40 | 12 | 6 | 1 | 3 | 7 | 9 | 12 | 19 | 5 | 21 | 12 | 56 | 13 | 69 | 14 |
| Grove Twp. | 50 | 11 | - | - | 5 | 6 | 9 | 10 | 20 | 5 | 25 | 13 | 65 | 12 | 78 | 14 |
| Gibson Twp. | 129 | 11 | 28 | 2 | 4 | 10 | 9 | 10 | 21 | 10 | 60 | 10 | 165 | 11 | 220 | 11 |
| Cameron County | 88 | 81 | 18 | 7 | 4 | 54 | 13 | 74 | 22 | 46 | 36 | 82 | 108 | 87 | 136 | 91 |

* Productive Man Work Units
Source: Field Investigations

better farms of the County. In general, high incomes from farming are the exception rather than the rule. Natural physical factors and the capacity of the local markets are unfavorable to the development of a large number of good farms. The area apparently cannot compete with those more favorably endowed with natural resources in the production for other markets.

Other Measures of Farm Capacity

Another measure of farm capacity is that of productive man work units. A productive man work unit is defined as the equivalent of a 10 hour day of average productive labor in caring for crops or livestock. For example, it takes approximately 10 hours per year to take care of an acre of hay, and that would be one productive man work unit -- or, it takes about 18 ten hour days to care for a dairy cow for a year, so caring for a cow amounts to 18 productive man work units per year. All the jobs on the farm are measured in terms of these standards. Productive man work units are in essence a common-denominator of effort expended in a variety of jobs. Studies in Centre County indicate that on the average, at least 200 units must be expended before a positive labor income is obtained.

Table 14 shows the average productive man work units per farm for the Cameron County farms from which records were obtained. The average for 91 farms is only 136 per farm; this indicates that not a great deal of farming activity is carried on. Only two of the local areas average more than 200 units per farm; in one of these there are just three, and in the other there are only eleven farms. One farm, when operated intensively, has a tendency to pull up the average for the area; that is the case in Gibson Township. Figure V shows the distribution of productive man work units per farm throughout the County. Such a figure presents a true situation

better than does the Table. Shippen Township leads in farming activity, but the amount of that activity is small per farm.

## Agricultural Debt

A relatively small amount of long term indebtedness exists in the County. The Federal Land Bank is the main source of credit. Exact figures on the total amount of debt cannot be given for it is impossible to determine how much of the debt contracted years ago has been amortized. No land bank loans have been made since 1928, and the County records show only one Land Bank Commissioner loan (1933).

The farms visited were found to have a total of approximately 3,700 acres mortgaged to the amount of $33,000 which is an average of approximately $9.00 per mortgaged acre . The 1935 Census gives the average value of land and buildings as $15.00 per acre of farm land for the County as a whole. Thus it appears that the ratio of debt to value is high, but it is to be remembered that most of these loans were made when land values were higher.

Nor is there a great amount of short term agricultural credit. No data were obtained on the amount of short term credit supplied by local banks, stores, machine companies, etc., but the loans made by the Federal government the past three years are listed as follows:

| Kind | 1934 | 1935 | 1936 |
|---|---|---|---|
| Production Credit | $ - | $1,500 | $575. |
| Crop & Feed Loans | - | - | 250. |
| Seed Loans | 75. | 150 | 300. |
| Rehabilitation Loans | - | - | 350. |

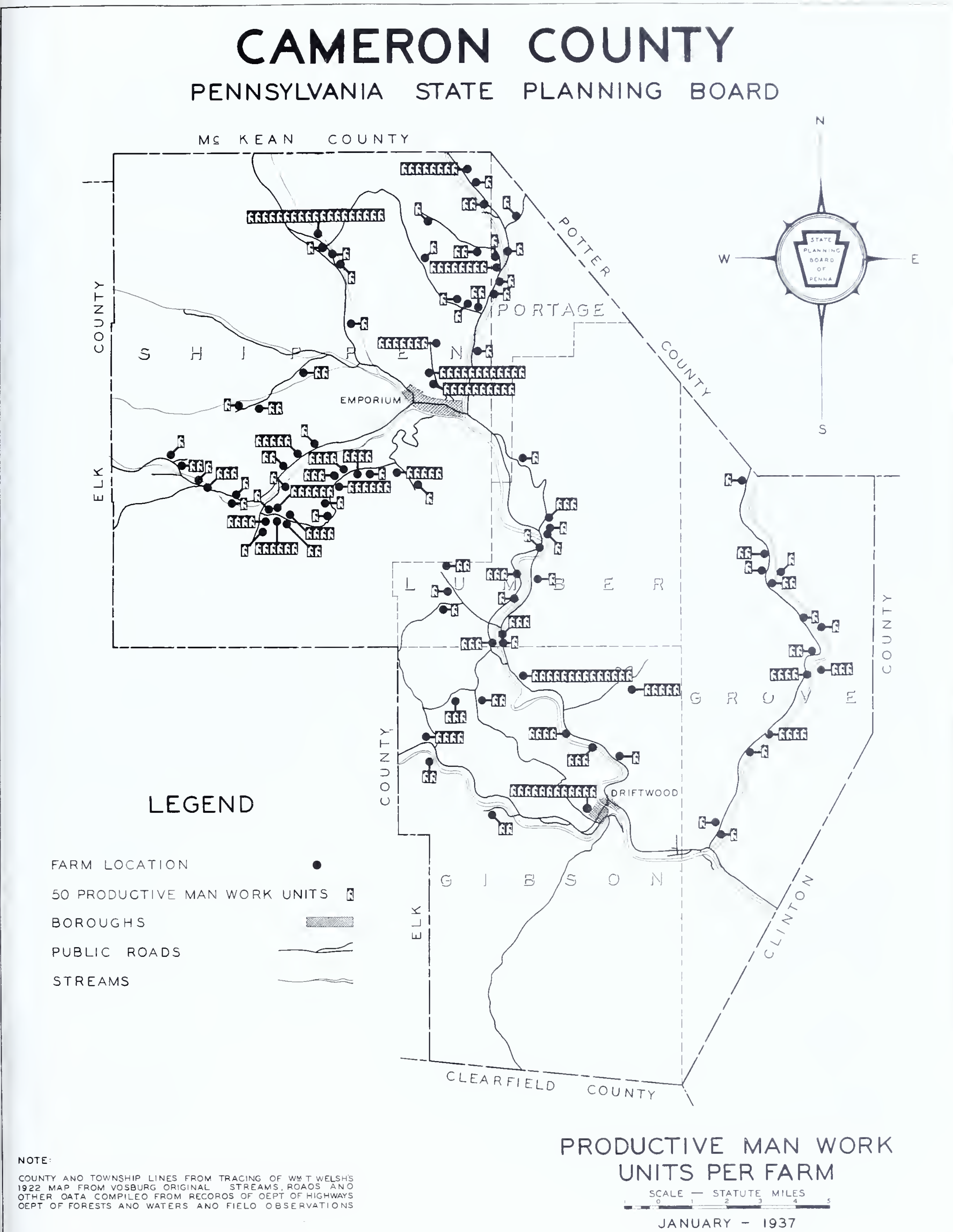
CAMERON COUNTY
PENNSYLVANIA STATE PLANNING BOARD
McKEAN COUNTY
POTTER COUNTY
ELK COUNTY
CLINTON COUNTY
CLEARFIELD COUNTY
SHIPPEN
PORTAGE
LUMBER
GROVE
GIBSON
EMPORIUM
DRIFTWOOD
N
S
E
W
STATE PLANNING BOARD OF PENNA
LEGEND
FARM LOCATION
50 PRODUCTIVE MAN WORK UNITS
BOROUGHS
PUBLIC ROADS
STREAMS
NOTE:
COUNTY AND TOWNSHIP LINES FROM TRACING OF WM T WELSHS 1922 MAP FROM VOSBURG ORIGINAL STREAMS, ROADS AND OTHER DATA COMPILED FROM RECORDS OF DEPT OF HIGHWAYS DEPT OF FORESTS AND WATERS AND FIELD OBSERVATIONS
PRODUCTIVE MAN WORK UNITS PER FARM
SCALE — STATUTE MILES
0 1 2 3 4 5
JANUARY - 1937

FIGURE V

Definite conclusions as to the agricultural debt situation cannot be given here. Neither the total amount of debt nor the repayment record is known. The problem appears to be two-fold; the individual has difficulty in obtaining credit, and also in carrying the burden of the debt.

RECREATIONAL LAND USE

The statement has been made previously that the State now owns over half the land area of the County. The State lands, by and large, are devoted to the use to which they are best adapted -- forestry, wild life propagation, and recreation. At present there is a conflict between these interests and the interests of the persons who are trying to make a living from agriculture. The State fosters and protects the deer, and the deer are doing much damage to the crops. In fact, that reason, more than any other, is given by residents as the explanation of why no more agriculture is attempted. With so much State land the deer are doubly secure. No reimbursement is offered the individual for damage done him by these publicly protected animals. Were reimbursement given for such damage, no doubt some individuals would take advantage of the opportunity and make unwarranted claims.

When crops are planted close to the forest from which the deer come to feed, damage is sure to result. More care might be exercised in the selection of fields cropped. Possibly some of the damage could be overcome if the State would follow an active policy of seeding down more of the open spaces and abandoned farms and thus providing a more abundant food supply. That policy is needed from a wild life protection-propagation point of view, but it would run up against limitations if put in force to curb the present evil. After the lapse of only a few years the number of

deer would increase so that there would still be damage to crops. However, the Game Commission policy of controlling animal numbers will alleviate this difficulty.

The logical solution would be to further the recreation, forestry, and game protection programs by devoting more land to these uses. The County is located in a recreational district, only a few hours drive from population centers. The income from hunters and sportsmen is of major importance to many of the inhabitants, and is an important one to others. Much more could be made of this feature by encouraging the building of camp sites and developing the recreation facilities as much as possible. Any other solution seems but temporary; agriculture is declining and will apparently continue to decline.

The State is facilitating recreational development by adding to the forests, by protecting wild life, and by leasing desirable camp sites to individuals on ten year contracts. At present there are approximately 200 such camps and there are numerous others located on privately owned land.

A State Park with camping and swimming facilities is located at Sizerville. Three auxiliary game refuges are controlled by the Game Commission -- a tract of privately owned land in Portage Township and two State owned tracts in Gibson and Grove Townships.

The County is noted for its hunting and fishing. It is estimated that 1,700 deer were killed during each of the two past seasons. Over 200 miles of trout streams also do much to attract visitors. Residents cater to the demands made by tourists, hunters, fishermen, and other vacationers, by supplying food and lodging. Hard roads enter the County from three

directions and give access to all of the major valleys. Improved dirt roads give sufficient access to the more remote areas. The attraction and access to the attraction are available. It but remains to further develop the use of these recreational resources.

The further development of these resources would encourage summer-long recreation residence. At present the people of the County do cater to the sportsmen interested in hunting and fishing, but the season for each is relatively short. More attention could well be devoted to increasing the length of time that other visitors spend in the area. The County has many sites that would make excellent locations for summer homes. The advantages of thus lengthening the period and increasing the number of vacationers are many. It is true that the water resources would need further development to encourage longer residence, but such action would add much to the recreational facilities of the County.

## SUMMARY

Each measure of the amount and distribution of agriculture in Cameron County points to the same conclusions. Farms are few, and only a limited number of them are offering the occupants comfortable livings. Land in the County can support farmers, but in most cases only by an almost prohibitive expenditure of human and physical resources. Agriculture is not the use to which the lands, particularly the uplands, are best adapted. Forestry apparently is impossible under the present system of taxation and harvest, except under public ownership. Recreational resources are only partially developed.

No doubt farm management practice could be improved on individual farms, and there is also no doubt that with sufficient capital and by the expenditure of unlimited amounts of labor the individual can make a

living -- but at what a cost in human effort! The individual would profit by acquiring a higher quality land located elsewhere and to it devote less in capital and labor to obtain the same or a higher return. There are also certain possibilities in part-time farming, if employment can be assured and if the location factor is adequately controlled. These, however, do not answer the question of what can be done to benefit those who by themselves cannot make such shifts.

The land use problems of Cameron County are a result of the following conditions:

(1) Unfavorable climatic and topographic characteristics.

(2) Agricultural use of land better adapted to forestry and recreation.

(3) Isolation of farms by continuous land abandonment.

(4) Presence of idle land.

(5) Too slow a development of recreational resources.

(6) Conflict of the State policy of game protection with the individual policy of use of land for crop production.

(7) Erosion and flood damage (increased by 1, 2, 3, and 4).

(8) Volume of business on many farms too small to constitute an economic unit.

(9) Uncertainties in the local market.

(10) Failure of individuals to adopt the best farm management and marketing practices.

These conditions are in most instances a statement of the problem itself, and each describes a situation for which remedial measures are necessary.

# GOVERNMENTAL SERVICES

## CAMERON COUNTY

### SCHOOLS

The following analysis of the school system is concerned primarily with finance. This phase of the study was conducted for the purpose of comparing the per pupil cost of education in the various school areas of the County and the effect of isolated settlement on school costs. A comparison of the sources of revenue, together with a few pertinent details of problems affecting particular school districts and areas, are also discussed in order to present a clear and complete analysis of the problems.

No attempt was made to ascertain the relative standard of education furnished to the pupils by the various schools of the County. It may be safely assumed, however, that a multiple room school with a teacher for one or two grades offers a more desirable standard than does a one-teacher one-room school housing eight grades.

Many of the data were obtained from the school financial reports and other records of the school districts as reported to the Department of Public Instruction. Other information was furnished by the County School Superintendent and the Supervising Principal of the Emporium Schools. Some data from the records compiled by the Federal Local School Units Project of the Department of Public Instruction were also utilized.

ORGANIZATION

The school system of Cameron County is composed of eight fourth class (less than 5,000 population) districts. These districts have a total of seventeen separate schools of varied size. Some districts have one-teacher one-room buildings housing eight grades while the largest district has a series of buildings housing eight grades and a high school. The locations of the rural schools and the attendance areas are shown by Figure VI. The schools of Emporium and Driftwood Boroughs are not shown. Since the borough of Emporium has the only high school in the County, all the high school pupils from the other districts attend there. The Portage school district has no schools, their school children are transported to Emporium.

School consolidations have taken place as shown by Table 15. They were accomplished by combining two or more schools in order to effect economies and to raise the standard of education. This works out very satisfactorily for rural schools provided that the distances from homes to schools are not too great and the consequent transportation costs too high. A consolidation that worked to good advantage in Cameron County took place in Grove Township. A few years ago there were four schools in this Township and an unsound financial condition existed. The school directors resigned and the County Superintendent was compelled to take matters into his own hands. A consolidation, with an increase in the school tax rate was effected and at the present time conditions are much more satisfactory. By referring to Figure VI, it will be seen that a single macadam road traverses the entire length of its narrow attendance area which makes this district ideal for this type of remedy. Unfortunately, this remedy cannot be applied to all distressed school districts,

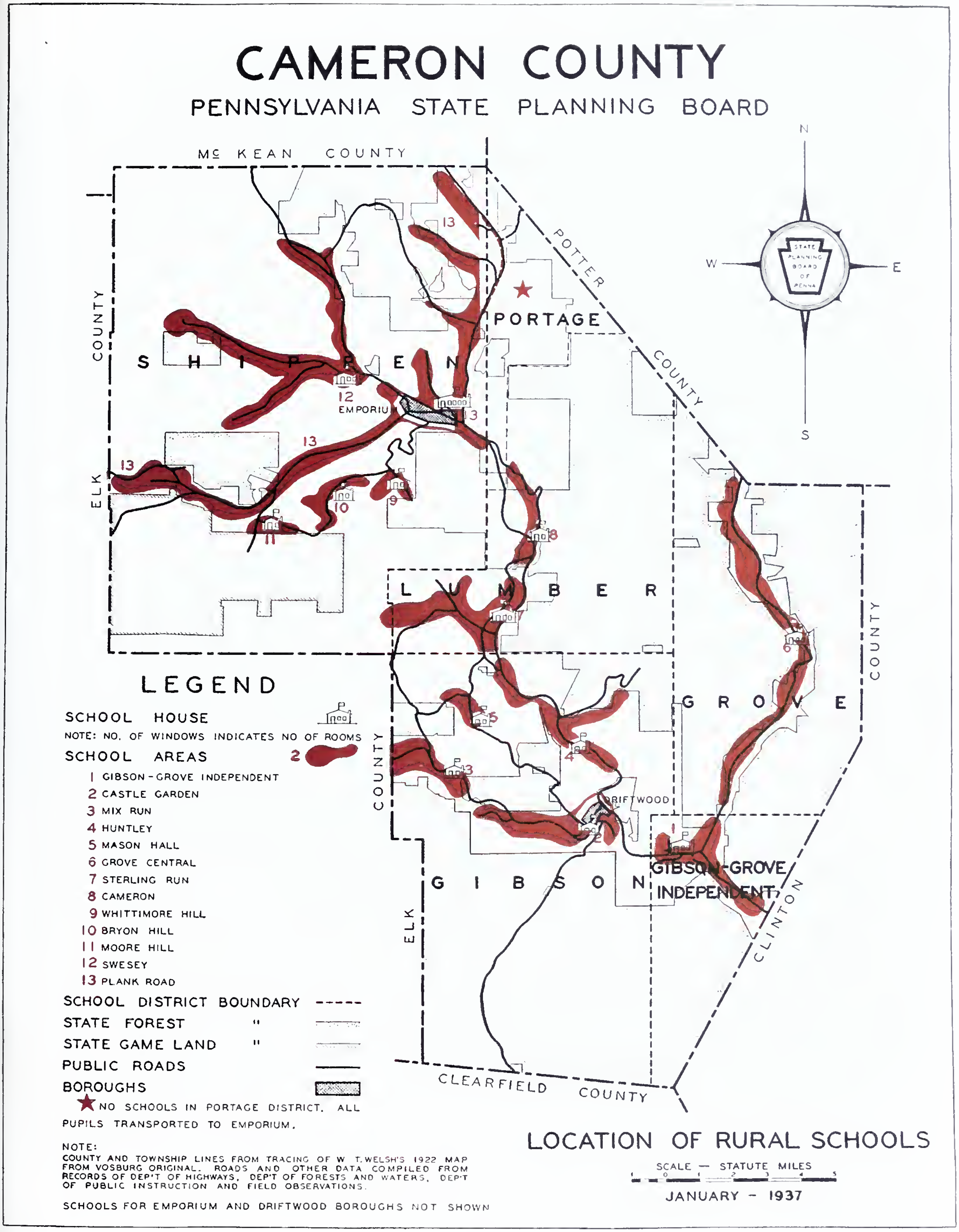
CAMERON COUNTY
PENNSYLVANIA STATE PLANNING BOARD
Mc KEAN COUNTY
POTTER COUNTY
ELK COUNTY
CLINTON COUNTY
CLEARFIELD COUNTY
N
S
W
E
STATE PLANNING BOARD OF PENNA
SHIPPEN
PORTAGE
EMPORIUM
LUMBER
GROVE
GIBSON
DRIFTWOOD
GIBSON-GROVE INDEPENDENT
LEGEND
SCHOOL HOUSE
NOTE: NO. OF WINDOWS INDICATES NO OF ROOMS
SCHOOL AREAS
1 GIBSON-GROVE INDEPENDENT
2 CASTLE GARDEN
3 MIX RUN
4 HUNTLEY
5 MASON HALL
6 GROVE CENTRAL
7 STERLING RUN
8 CAMERON
9 WHITTIMORE HILL
10 BRYON HILL
11 MOORE HILL
12 SWESEY
13 PLANK ROAD
SCHOOL DISTRICT BOUNDARY
STATE FOREST "
STATE GAME LAND "
PUBLIC ROADS
BOROUGHS
★ NO SCHOOLS IN PORTAGE DISTRICT. ALL PUPILS TRANSPORTED TO EMPORIUM.
NOTE:
COUNTY AND TOWNSHIP LINES FROM TRACING OF W. T. WELSH'S 1922 MAP FROM VOSBURG ORIGINAL. ROADS AND OTHER DATA COMPILED FROM RECORDS OF DEP'T OF HIGHWAYS, DEP'T OF FORESTS AND WATERS, DEP'T OF PUBLIC INSTRUCTION AND FIELD OBSERVATIONS.
SCHOOLS FOR EMPORIUM AND DRIFTWOOD BOROUGHS NOT SHOWN
LOCATION OF RURAL SCHOOLS
SCALE — STATUTE MILES
JANUARY - 1937

FIGURE VI

because of transportation difficulties occasioned by poor roads or rugged terrain, or because of a too widely scattered population.

Table 15 shows size, location and certain other characteristics of the schools in Cameron County.

- TABLE 15 -

SCHOOL DISTRICTS AND SCHOOLS IN CAMERON COUNTY - 1935-36

| SCHOOL DISTRICT | School Name | Number Pupils | Number Teachers | Number Rooms | Character of Building | Consol-idated |
|---|---|---|---|---|---|---|
| GIBSON | Castle Garden | 25 | 1 | 2 | Frame | No |
| | Huntley | 18 | 1 | 1 | Frame | No |
| | Mason Hill | 4 | 1 | 1 | Frame | No |
| | Mix Run | 3 | 1 | 1 | Frame | No |
| GIBSON-GROVE IND. | Gibson Grove Ind. | 57 | 2 | 4 | Brick | Yes |
| GROVE | Central | 41 | 2 | 2 | Asbestos | Yes |
| LUMBER | Cameron | 17 | 1 | 1 | Frame | Yes |
| | Sterling Run | 54 | 2 | 2 | Asbestos | Yes |
| PORTAGE | No Schools | - | - | - | - | - |
| SHIPPEN | Bryan Hill | 17 | 1 | 1 | Frame | No |
| | Moore Hill | 12 | 1 | 1 | Frame | No |
| | Plank Road | 187 | 4 | 4 | Frame | Yes |
| | Swesey | 74 | 2 | 2 | Concrete Blk. | Yes |
| | Whittimore Hill | 6 | 1 | 1 | Frame | No |
| DRIFTWOOD | Driftwood | 74 | 2 | 2 | Frame | No |
| EMPORIUM | * | 880 | 33 | * | * | * |
| TOTAL | 17 | 1,469 | 55 | - | - | - |

* Three Buildings.

A State Law* vests the Department of Public Instruction with the power to refuse permission to school districts to operate a school with ten, or less than ten, pupils in average daily attendance, unless there is ample justification for such operation. Mix Run, Mason Hill and Whittimore Hill schools are the examples of this situation in Cameron County. They are also outstanding in high per pupil costs. The Mix Run school is permitted to operate because all the pupils reside across Bennett's Branch of the Sinnemahoning without bridge facilities. Mason Hill and Whittimore Hill schools are located on plateaus where accessibility to other schools is extremely difficult most of the school year because of hazardous road and weather conditions.

As stated, Emporium has the only high school in the County. Other districts send their high school pupils there. Since the standard of education differs in the schools of the outlying districts from that in Emporium grade schools, a problem is created in the Emporium High School. There are a number of subjects taught in the elementary schools of Emporium, especially in the two grades (7th and 8th) immediately preceding high school, that are not in the curricula of the rural school districts. This different type of elementary training not comparable with that which the pupils in Emporium receive, necessitates dividing the classes in the high school into two groups - one for the non-resident pupils and another for the resident.

As a solution of this problem, it is suggested that the outlying districts, in addition to transporting their high school pupils, also transport those in the two preceding grades. While this would

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* School Laws of Pennsylvania - Section 1406.

reduce the attendance and increase slightly the cost per pupil in the rural schools, in addition to the tuition charged by the Emporium school district, the greater educational advantages given the seventh and eighth grade pupils should make it worthwhile. Since transportation is already established by all districts for students attending Emporium High School, the additional load would not effect transportation costs materially.

For the present, in view of the sparse settlement and the manner in which the County is divided into small school districts, the system is controlled as well as circumstances permit. Any further improvement would have to come from the consolidation of two or more school districts. The possible consolidation of the entire County system with schools at one or two points, if the transportation problem can be solved, may be desirable.

## COSTS

There are certain minimum costs in the operation of a school, regardless of the number of pupils attending. The result naturally expected would be a high cost per capita burden on the inhabitants of the less populous areas, but this burden is not always carried by the persons residing in these particular localities. Within the same district, the operating cost per pupil may be five or six times as much in one school as in another, but the school district levies all taxes on the same basis, regardless of local conditions of component school area costs. This causes disproportionate ratios of taxes to actual expenditures, as between school areas within the same school district. Where there is a large State subsidy, it appears that there is a tendency on the part of the

- TABLE 16 -

SCHOOL EXPENDITURES* BY SCHOOL AND SCHOOL DISTRICTS IN CAMERON COUNTY FOR THE SCHOOL YEAR 1935 - 1936

| District and School | Length of Term (Days) | Average Daily Attendance (ADA) | Teachers Salaries | **Other Current Expenses | Tuition Paid Other Districts | *All Exp. Exclusive of Transportation | Yearly Cost per Pupil in ADA (Trans. Excluded) | Transportation | *Total Expenses (Including Trans.) | Yearly cost Per Pupil in ADA | Daily cost Per Pupil in ADA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GIBSON TOWNSHIP | - | 56.2 | $ 3,200. | $ 1,128. | $ 476. | $ 4,804. | $ 85.48 | $ 917. | $ 5,721. | $101.80 | $ .62 |
| Castle Garden | 160 | 23.1 | 800. | 384. | - | 1,184. | 51.25 | - | 1,184. | 51.25 | .32 |
| Huntley | 160 | 16.0 | 800. | 314. | - | 1,114. | 69.62 | 512. | 1,626. | 101.63 | .64 |
| Mason Hill | 160 | 4.0 | 800. | 197. | - | 997. | 249.25 | - | 997. | 249.25 | 1.56 |
| Mix Run | 160 | 2.6 | 800. | 184. | - | 984. | 378.46 | - | 984. | 378.46 | 2.37 |
| H.S. Pupils Transp. | 180 | 10.5 | - | 49. | 476. | 525. | 50.00 | 405. | 930. | 88.57 | .49 |
| GIBSON-GROVE IND. | - | 54.6 | 1,600. | 775. | 455. | 2,830. | 51.83 | 831. | 3,661. | 67.05 | .41 |
| Gibson Grove | 160 | 46.7 | 1,600. | 752. | - | 2,352. | 50.36 | 345. | 2,697. | 57.75 | .36 |
| H.S. Pupils Transp. | 180 | 7.9 | - | 23. | 455. | 478. | 60.51 | 486. | 964. | 122.02 | .68 |
| GROVE TOWNSHIP | - | 35.6 | 1,200. | 259. | 70. | 1,529. | 42.95 | 993. | 2,522. | 70.84 | .44 |
| Central | 160 | 33.7 | 1,200. | 252. | - | 1,452. | 43.09 | 913. | 2,365. | 70.19 | .44 |
| H.S. Pupils Transp. | 180 | 1.9 | - | 7. | 70. | 77. | 40.53 | 80. | 157. | 82.63 | .46 |
| LUMBER TOWNSHIP | - | 77.7 | 2,400. | 775. | 1,050. | 4,225. | 54.38 | 1,197. | 5,422. | 69.78 | .42 |
| Cameron | 160 | 14.0 | 800. | 293. | - | 1,093. | 78.07 | 320. | 1,413. | 100.93 | .63 |
| Sterling Run | 160 | 44.8 | 1,600. | 451. | - | 2,051. | 45.78 | 246. | 2,297. | 51.27 | .32 |
| H.S. Pupils Transp. | 180 | 18.9 | - | 31. | 1,050. | 1,081. | 57.20 | 631. | 1,712. | 90.58 | .50 |
| PORTAGE TOWNSHIP | - | 26.4 | - | 77. | 1,089. | 1,166. | 44.16 | 580. | 1,746. | 66.14 | .37 |
| Elem. Pupils Transp | 180 | 17.1 | - | 50. | 569. | 619. | 36.20 | 374. | 993. | 58.07 | .32 |
| H.S. Pupils Transp. | 180 | 9.3 | - | 27. | 520. | 547. | 58.82 | 206. | 753. | 80.97 | .45 |
| SHIPPEN TOWNSHIP | - | 281.6 | 7,664. | 3,264. | 3,201. | 14,129. | 50.17 | 4,860. | 18,989. | 67.43 | .41 |
| Bryan Hill | 160 | 14.4 | 800. | 262. | - | 1,062. | 73.75 | - | 1,062. | 73.75 | .48 |
| Moore Hill | 160 | 10.6 | 800. | 243. | - | 1,043. | 98.40 | - | 1,043. | 98.40 | .61 |
| Plank Road | 160 | 126.3 | 3,464. | 1,696. | - | 5,160. | 40.86 | 1,900. | 7,060. | 55.90 | .35 |
| Swesey | 160 | 62.9 | 1,800. | 791. | - | 2,591. | 41.19 | 2,260. | 4,851. | 77.12 | .48 |
| Whittimore Hill | 160 | 5.8 | 800. | 196. | - | 996. | 171.72 | - | 996. | 171.72 | 1.07 |
| H.S. Pupils | 180 | 61.6 | - | 76. | 3,201. | 3,277. | 53.20 | 700. | 3,977. | 64.56 | .36 |
| DRIFTWOOD (BORO) | - | 79.1 | 1,600. | 959. | 1,024. | 3,583. | 45.30 | 162. | 3,745. | 47.35 | .29 |
| Driftwood | 160 | 59.3 | 1,600. | 923. | - | 2,523. | 42.55 | - | 2,523. | 42.55 | .27 |
| H.S. Pupils Transp. | 180 | 19.8 | - | 36. | 1,024. | 1,060. | 53.54 | 162. | 1,222. | 61.71 | .34 |
| EMPORIUM (BORO) | - | 641.4 | 34,599. | 17,030. | - | 51,629. | 80.49 | - | 51,629. | 80.49 | .45 |
| Elem. Pupils | 180 | 334.9 | 13,811. | 6,831. | - | 20,642. | 61.64 | - | 20,642. | 61.64 | .34 |
| H.S. Pupils | 180 | 306.5 | 20,788. | 10,199. | - | 30,987. | 101.10 | - | 30,987. | 101.10 | .56 |
| County Total | - | 1,252.6 | 52,263. | 24,267. | 7,365. | 83,895. | 66.98 | 9,540. | 93,435. | 74.59 | .43 |

* Exclusive of Debt Service and Capital Outlay.

** Includes General Control, other Expenses of Instruction, Expenses of Auxiliary Agencies, Operation and Maintenance of School Plant and Fixed Charges.

school district receiving it to overlook or minimize the desirability of seeking to reduce the high cost of operating their school areas, since the State subsidy shifts the burden outside of the district.

In most of the consolidated schools and in those with the larger number of pupils in attendance, the cost of education per pupil has been kept comparatively low. In most cases where the attendance is small, however, a very high cost of education per pupil exists.

Table 16 illustrates the educational cost per pupil in average daily attendance at the various schools. Some assumptions had to be made in computing costs of items not directly charged to a particular school. These items, such as general control, fuel, light and power, etc., were allotted to the schools in the particular district on a per pupil or per school basis, depending on the nature of the item. In any case, if the assumptions were not entirely correct, the maximum difference in the result could amount to only a few dollars per pupil, which would not materially affect the illustration.

It will be noticed in Table 16 that high school transportation costs vary widely between different districts, considering the numbers of pupils and the distances traversed. Since it is not mandatory that school districts furnish transportation to all pupils, there are instances where these costs are not comparable as between districts. This causes a large number of pupils in average daily attendance to be listed with a very low cost for transportation or vice versa. In the case of Shippen Township, the proximity to Emporium avoids the necessity of furnishing transportation for all their pupils.

Table 16 also shows an inconsistency in the high school tuition costs among the school districts sending their high school pupils to Emporium. This is largely explained by the tuition charges being based on enrollment rather than upon attendance. The larger cost per high school pupil shown for the Emporium students over that for the students in the other school districts in the County is caused by the tuition rate being based solely upon the cost of tuition, textbooks and school supplies.

The latest available State cost per pupil in average daily attendance for current expenses for fourth class school districts was $57.52 for the school year 1934-35. This figure is exclusive of debt service and capital outlay, but includes all elementary and high schools. Since advance estimates place the 1935-36 cost per pupil only a few dollars in excess of the 1934-35 figures, the amount of $57.52 is reasonably comparable to the costs shown by Table 16.

In comparison with the State average, 10 of the 14 schools in the County, exclusive of the three schools in Emporium, are above average in per pupil cost. The County cost per pupil in average daily attendance is approximately 25 per cent above that for the State, and while this is not excessive when compared with contiguous counties, it is significant that Cameron County must be classed with the counties having a high cost per pupil. While the cost of operating schools is ordinarily greater, in proportion as school standards are higher, it is highly probable that in Cameron County the higher cost of schooling arises from local causes, such as are peculiar to isolation and sparseness of population. Inasmuch as all Cameron County schools, with the exception of Emporium, are operated

on a 160 day basis (the minimum school term as required by law), it is brought out even more forcibly that most of the County's schools are operated at a relatively high cost per pupil. The computation of school costs on a daily basis, permits a fairer comparison of costs between schools having different lengths of school year.

Further analysis of the costs in the Gibson Township school district shows that the amounts chargeable to the Mix Run and Mason Hill school are 41.3 per cent of the total cost of operating the schools in the entire district. Considering that this cost educates only 6.6 pupils in average daily attendance, representing 14.4 per cent of the total number of pupils in the district, the excessive cost of furnishing school services to isolated areas, where schools having a very low attendance are needed, is readily discernible.

In Table 17 school expenses exclusive of transportation were computed in order to show the effect of transportation alone on the school costs. Within some school areas having a comparatively low average cost per pupil there are examples of high costs per pupil not readily apparent in Table 16.

Table 17 shows for the Huntley school, for instance, a school cost of $70. per pupil exclusive of the cost of transportation. However, transportation is furnished to only three pupils in this school area, which raises the school cost for these three transported pupils to $241. each. It is also interesting to note, that of the total school cost per pupil for the 107 pupils, nearly 50 per cent is expended for transportation.

- TABLE 17 -

TRANSPORTATION COSTS PER PUPIL TRANSPORTED, FOR SEVERAL SCHOOLS IN CAMERON COUNTY - 1935-36

| District | School | No. Pupils Trans-ported | Trans-porta-tion Costs | Trans-porta-tion Cost per Pupil | School Costs per Pupil Exclusive of Transporta-tion | Average Year-ly Cost Per Transported Pupil |
|---|---|---|---|---|---|---|
| Gibson | Huntley | 3 | $ 512. | $ 171. | $ 70. | $ 241. |
| Gibson-Grove | Gibson-Grove | 8 | 345. | 43. | 50. | 93. |
| Grove | Central | 30 | 913. | 34. | 43. | 77. |
| Lumber | Cameron | 3 | 320. | 107. | 78. | 185. |
| Lumber | Sterling-Run | 3 | 246. | 82. | 46. | 128. |
| Shippen | Swesey | 60 | 1900. | 32. | 41. | 73. |
| Totals & Averages | | 107 | $4236. | $ 40. | $ 44. | $ 84. |

Contributions made in the form of school taxes by taxpayers in most of the small attendance areas are a mere fraction of the total amount expended. Since there are certain minimum costs necessary in the operation of a school, the expenditures cannot be reduced below that amount. The small number of taxpayers living in such areas are able to contribute only a small portion of the revenue necessary to operate the schools. As mentioned before, this would seem to throw the burden of school maintenance upon the balance of the district. However, high State subsidy causes much of the burden to be shifted to the State as a whole. There are many instances of these situations existing throughout the County. To show conditions that are likely to be found in the sparsely inhabited sections, the relationship of school taxes paid by the resident taxpayers to the school costs is shown in Table 18 for several selected school areas.

- TABLE 18 -

RELATIONSHIP OF SCHOOL TAXES PAID BY RESIDENT REAL ESTATE OWNERS TO THE COST OF SCHOOLS IN SELECTED SCHOOL AREAS WITHIN DISTRICTS IN CAMERON COUNTY - 1935

| School Area | Acres of Land | | | Assessed Valuation | School Taxes Levied | School Taxes Paid | School Costs | Per Cent Paid By Local Residents |
|---|---|---|---|---|---|---|---|---|
| | Im-proved | Unim-proved | Total | | | | | |
| A | 26 | 76 | 102 | $1718. | $34.36 | $34.36 | $984. | 3.5 |
| B | 96 | 252 | 348 | 2579. | 51.58 | 45.18 | 997. | 4.5 |
| C | 106 | 520 | 626 | 4823. | 96.46 | 78.86 | 996. | 7.9 |

It is not expected that residents should pay all the school costs of their particular area, but it is obvious that a contribution of only a few percent is out of proportion to the cost of services furnished. The small amount of improved land, shown by Table 18, adds doubt as to the justification for further occupancy of some of these areas.

Further analysis of the finances of the three selected school areas, A, B, and C, show that the school costs for the three areas total $2977. The number of pupils in average daily attendance is 12.4 for these three areas. Assuming that less isolated residences were found for these families elsewhere in the County and that their children could be educated for the County's average cost per pupil, the total school cost for these pupils would then be $925. This would represent a saving of $2052. per year over the present arrangement. If the assessed valuation of the real estate can be taken as a criterion of its true value, the savings, by the elimination of the schools in these areas, could furnish more than enough funds to purchase these properties within five years. In addition there

would undoubtedly be savings by eliminating the necessity for certain roads used by these isolated families, thus shortening the period in which the savings from reduced governmental services in this area could purchase the properties. However, the school authorities have no legal right to handle the situation by purchase. This need not prevent other agencies, by planned procedure (as is discussed further in the recommendations), to concentrate their land acquiring activities on areas of this sort to good advantage. Zoning could be useful, in these instances, for preventing a continuance of such conditions, if any or all of these properties were abandoned or offered for sale.

SOURCE OF REVENUE

While the financial conditions of the various school districts are not entirely the same, there are none in the County that could be classified as critical at this time, although as mentioned previously, there have been difficulties in some districts in the past. The help of the County school superintendent and consolidations rectified one of these conditions, but the credit for being free of serious financial difficulties is due, in most cases, to generous State subsidies rather than to the tax contribution of local residents. The extent of this subsidy is shown by school districts in Table 19.

Table 19 is based on a six year period which minimizes the result of any unusual situation occurring in any one year. It will be noticed that Gibson, Grove, Lumber and Portage districts receive over 50 per cent of their receipts from the State and contribute least by payment of local taxes. These townships are also most representative of scattered population conditions.

- TABLE 19 -

SOURCE OF SCHOOL RECEIPTS BY SCHOOL DISTRICTS IN CAMERON COUNTY YEARLY AVERAGED FOR A SIX YEAR PERIOD. 1930-35.

| School District | Local Taxes | Per Cent | *Other Sources | Per Cent | State Appro-priations | Per Cent | Total Receipts |
|---|---|---|---|---|---|---|---|
| Gibson Twp. | $2204. | 31.6 | $673. | 9.6 | $4103. | 58.8 | $6980. |
| Gibson-Grove Ind. | 2122. | 48.0 | 624. | 14.1 | 1695. | 37.9 | 4423. |
| Grove Twp. | 394. | 12.8 | 554. | 17.9 | 2139. | 69.3 | 3087. |
| Lumber Twp. | 1859 | 31.4 | 854. | 14.4 | 3207. | 54.2 | 5921. |
| Portage Twp. | 449. | 35.0 | 130. | 10.1 | 706. | 54.9 | 1286. |
| Shippen Twp. | 10945 | 47.9 | 1497. | 6.5 | 10409. | 45.6 | 22851. |
| Driftwood Boro. | 2273. | 61.5 | 239. | 6.5 | 1182. | 32.0 | 3693. |
| Emporium Boro. | 29322. | 54.5 | 937. | 1.8 | 23512. | 43.7 | 53771. |
| County Total | 49568. | 48.6 | 5508. | 5.4 | 46953. | 46.0 | 102012. |

* In the Townships this is composed largely of contributions by the State on State owned land in lieu of taxes.

State averages comparable to Table 19 are not readily available, but upon checking the source of school receipts of the districts of various counties for a similar period, it was learned that the State school subsidy for many counties would not average more than 20 to 30 per cent. This indicates that the amount of State aid received by the school districts of Cameron County is considerably more than that received by most districts in the State.

The State contributes to each district two cents for school purposes for every acre of State owned land in the district. A law to this effect was passed for the purpose of augmenting a school district's income when the tax base was decreased by the State acquisition of land. The procedure works out very well up to a certain point, but is in need of adjustment. When the State has acquired most of the land in a school district which has lost a large portion of its population, the two cents per acre payment becomes excessive in comparison with the revenue needed by the community. This has a tendency to relieve those remaining of the responsibility of paying a fair share of their school revenue and shifts the burden to the State. Several school districts in Cameron County are approaching this situation and a readjustment of policy involving revision of laws should be given thought.

PERTINENT EXAMPLES OF PROBLEMS

The school district of Portage Township, is an example of a district rapidly approaching a crisis concerning the source of school revenue. In 1925 the Portage school was closed and since then all the pupils in the district have been transported to Emporium. This worked out very well for a time from an educational and a financial point of view. There were few pupils in the Township (in 1930 the school census reported only nine) and since the tuition charge per pupil by the Emporium school district was not excessive, a saving in school costs was effected by closing the school. In addition, the Emporium schools were able to offer a better standard of education than was possible in a one-room rural school of small attendance.

During the past few years Emporium has been expanding industrially and the number of home seekers is increasing. Portage Township appears to be a desirable place of residence for families with children of school age because of its proximity to Emporium and its school facilities. This has resulted in an increase in population for Portage Township with a corresponding increase in the number of school children.

The tax base and school receipts in Portage Township are not keeping step with the added burden of school costs. The total school costs of the Township have jumped from several hundred dollars in 1925 to over seventeen hundred dollars in 1935 and further increases are expected. This necessitates seeking additional school receipts to avoid an impending deficit. The school revenue derived from the taxes paid by new residents is much less than the increased school costs, because the type of building erected, in most cases, does not warrant a large assessment. Added revenue from an increase in the millage rate would amount to little. The present rate is 20 mills and the maximum permissable by law is only 25 mills, except under certain conditions when this may be increased to 35 mills. The maximum per capita tax of $5 is also collected at the present, thus eliminating the possibility of additional revenue from this source. The only immediate recourse under the present organization of school districts, will be to apply for more State aid when the crisis is reached.

A possible solution to this problem might be the reopening of a school in Portage Township, but since the former building has been sold, it would mean a large investment which would further complicate the situation. Thought must also be given to the future needs of this community and

the justification for an expenditure of this sort. Consolidation of Portage Township with Emporium should be helpful, but this could hardly take place as long as local initiative is required. However, mergers of school districts, where no teachers are employed, are provided for by Act No. 157 passed by the General Assembly of 1937. Civic pride alone causes strong local opposition to such moves, but the recommendations of a County body capable of intelligent planning might have an effect on this opposition.

Another instance where the greater opportunities afforded by a larger school are apparently recognized, similar to a consolidated school arrangement, is in the case of at least four families living in the vicinity of Emporium in Shippen Township. In addition to paying school taxes to the Township, they pay tuition charges to Emporium, because, it may be assumed, they desire to have their children enjoy the educational facilities afforded by the Borough. Many other families may also be desirous of doing this, but find the cost prohibitive.

Control of population movement by rural zoning is the partial answer to many of the problems discussed in this section. A specific illustration of the need for rural zoning follows. A family, which included several children of school age, was evicted from a house in one of the boroughs of the County. Unable to find another house in the town, they moved to a sparsely settled section of the County already having school problems which were burdensome to the school district and to the State, thus further complicating the situation. In this family there was

also a child eligible to attend high school and desirous of doing so, but the privilege was denied because of the lack of adequate transportation. Had zoning been in effect and this area zoned against permanent inhabitation, this family could have been prevented from moving into the area.

Although every individual school problem in Cameron County has not been touched upon in this section, it is felt that enough outstanding examples have been discussed to show the kind of school problems existing. These problems are prevalent not only in Cameron County, but in every County in the State containing areas wherein exist sparse and isolated populations. It is obvious that the initiation of correctional measures by intelligent planning is desirable to forestall further aggravation or the creation of additional problems of a similar nature. Discussion of the relationship of school problems to other problems and recommendations for the improvement of conditions will be given in the section on recommendations and conclusions.

GOVERNMENTAL SERVICES

CAMERON COUNTY

## ROADS

The road system of Cameron County is not of a complex nature. The rugged topography caused most of the highways to be constructed parallel to the main streams. These highways traverse the County from border to border and are connecting links in the State highway system.

All the highways in the County were controlled locally before the Sproul Act of 1911. Under the terms of this Act, the State acquired control of most of the main roads. In later years more local roads were added to the State system. By 1936 there were approximately 241 miles of road in the County, of which nearly 50 per cent was controlled by the State. Borough streets (exclusive of those termed State Highways), Township, and Forest roads account for the balance. Figure VII shows the location, identity and type of construction of all public roads in the County.

The Forest roads are constructed and maintained as needed by State and Federal agencies and any problems emanating from their existence are not of a strictly local nature. The mileage in borough streets is small and is not of major consequence in the analysis of County problems.

The township roads, to the problems of which this section of the report is devoted, branch from the main highways and traverse mountains

and small valleys and furnish road facilities to the sparsely settled sections.

Statistical information was taken from the township financial reports which are on file in the Township Engineer's office of the State Highway Department. Other data were obtained from the Highway Planning Division of the same Department, Department of Forests and Waters and through interviewing various officials interested in township affairs.

## TOWNSHIP ORGANIZATION

There is a total of approximately 71.6 miles of road in the County under the control of the five townships. The general supervision of road affairs in each township is in the hands of three elected township supervisors. These officials appoint a secretary and treasurer, serve as or employ roadmasters and hire road labor on a per diem basis when needed. Other elective offices include three auditors, one assessor and one tax collector. The supervisors may elect, by a vote of a majority of the members, one solicitor and one engineer.

The supervisors are required by law to meet at least once per month and the necessary expenses incurred in such meetings, including compensation for attendance, are paid out of road funds.

## TOWNSHIP ROAD COSTS

Township roads, as shown by Figure VII, are not continuous; short lengths occur at various locations. The actual expenditures for any specific section of road within a township cannot be readily ascertained since township records are kept only for the total cost of

all roads. This necessitates the pro-rating of the expenditures for each township on a per mile basis, - assuming each mile of road to be comparable, - in order to arrive at the cost of furnishing road facilities to the sparsely settled sections. While this assumption is not entirely correct, the results obtained by this method, especially over a period of years, should be sufficiently accurate for the purpose of this study. The cost comparisons deal only with the actual amounts expended for roads regardless of standards. It is known, however, that all the townships keep their roads in a passable state, so that the conditions of all should be fairly comparable.

Table 20 shows the distribution of township road mileage among the various townships and the type of expenditures for these roads.

- TABLE 20 -

ROAD MILEAGE AND EXPENDITURES BY TOWNSHIPS IN CAMERON COUNTY
YEARLY AVERAGE FOR A SEVEN-YEAR PERIOD - 1930-1936

| Township | Mileage | Construction and Maintenance | | | | Administrative | Cost Per Mile | ***Debt Service Interest | Grand Total | Cost Per Mile |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Construction | Maintenance | Total | Cost Per Mile | | | | | |
| Gibson | 22.2 | $ 738. | $1,186. | $1,924. | $87. | $289. | $13. | $ - | $ 2,213. | $100. |
| Grove | .9 | 51. | 536. | 587. | 652. | 223. | 248. | - | * 810. | 900. |
| Lumber | 10.5 | 292. | 1,182. | 1,474. | 140. | 215. | 21. | 7. | 1,696. | 162. |
| Portage** | 2.5 | 78. | 199. | 277. | 111. | 81. | 32. | 2. | 360. | 144. |
| Shippen | 35.5 | 1,533. | 3,933. | 5,516. | 156. | 548. | 15. | 50. | 6,064. | 171. |

* Does not include $779 expended for street lights.
** Yearly average for six years - No report for 1936 available.
*** Principal payments accounted for when loan was expended.

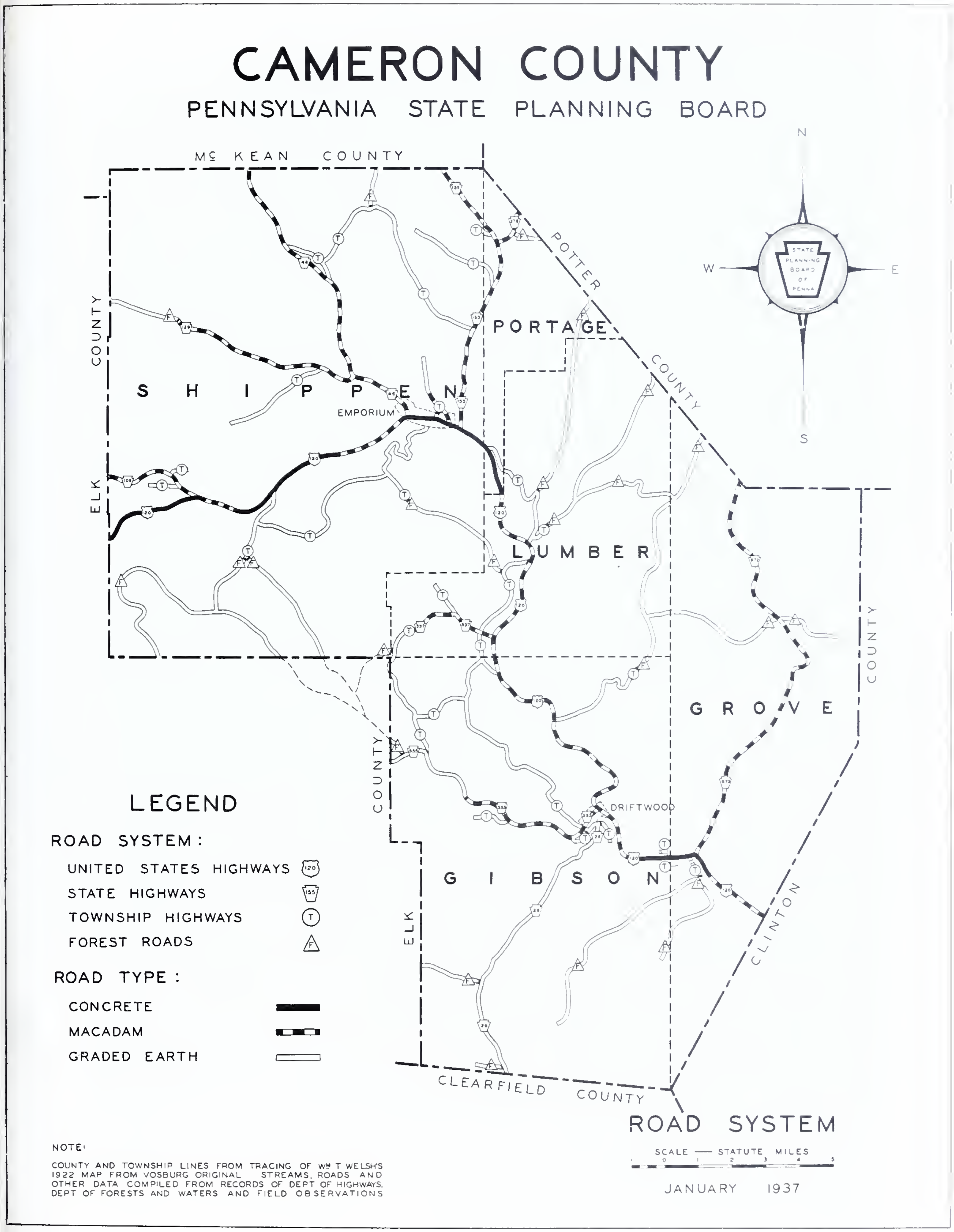
CAMERON COUNTY
PENNSYLVANIA STATE PLANNING BOARD
Mc KEAN COUNTY
POTTER COUNTY
ELK COUNTY
CLINTON COUNTY
CLEARFIELD COUNTY
SHIPPEN
PORTAGE
LUMBER
GROVE
GIBSON
EMPORIUM
DRIFTWOOD
N
S
E
W
STATE PLANNING BOARD OF PENNA
LEGEND
ROAD SYSTEM:
UNITED STATES HIGHWAYS
STATE HIGHWAYS
TOWNSHIP HIGHWAYS
FOREST ROADS
ROAD TYPE:
CONCRETE
MACADAM
GRADED EARTH
NOTE:
COUNTY AND TOWNSHIP LINES FROM TRACING OF Wm T WELSH'S 1922 MAP FROM VOSBURG ORIGINAL. STREAMS, ROADS AND OTHER DATA COMPILED FROM RECORDS OF DEPT OF HIGHWAYS, DEPT OF FORESTS AND WATERS AND FIELD OBSERVATIONS
ROAD SYSTEM
SCALE — STATUTE MILES
0 1 2 3 4 5
JANUARY 1937

FIGURE VII

Table 20 shows that Grove Township's expenditure per mile of road is excessive when compared to those for the other townships. There are several factors which account for this high cost, assuming that the funds were handled economically. This road is not entirely comparable to those of the other townships, since it serves the urban communities of Sinnemahoning and Wyside and is more analogous to a borough street. This, however, is only a partial explanation, for the amount expended is excessive even when compared with urban street costs.

A high administrative cost per mile results when minimum duties and costs are imposed by law on a township controlling a small amount of road mileage. Strict adherence to the law requiring a minimum of twelve meetings per year for which a supervisor shall receive not less than $2.50, nor more than $4.00 (Grove Township pays $3.60). Compulsory inspection of highways and reports by roadmasters, auditors' fees, etc., make administrative costs high.

Not only administrative, but also construction and maintenance costs are affected by maintaining an organization to supervise a small amount of road. It is not economical to own and maintain costly road equipment for a limited amount of road. Most of the work must be done by hand, or if necessary by rented equipment, at a cost per mile exceeding that for townships in which the owning of machinery is economically feasible. Material purchases in large quantities, with corresponding savings, are also impractical. Compensation for supervisors or roadmasters contribute to the high cost of road repair, since even

the smallest job must be supervised, and overseers are paid not less than \$3.00 nor more than \$6.00 per day..

All this raises the question as to the wisdom of the township organization law when applied to townships having a limited amount of township road under their jurisdiction. When the township road mileage in a particular township has been reduced to an insignificant amount, the State could cooperate by absorbing this remainder. Some such procedure could eliminate the necessity of a township road organization and materially reduce the cost of administration, construction, and maintenance. An alternative solution would be to merge two or more township road districts. This would require only one administrative body and should prove economical by reducing the necessity for more than one set of road building and maintenance equipment.

In various locations throughout the County are miles of township road furnishing facilities for a limited number of families. Of course, these roads are also used somewhat by forest workers and for recreational purposes, but since such use is seasonal, the cost of maintenance for these purposes could be considerably less than if the roads were kept in shape for daily travel. In addition, if maintained solely for forest and recreational uses, possibly relocations of parts of the roads could be effected; using more direct routes to the forests, some mileage could be eliminated and the accessibility to the forests increased.

Without a more detailed investigation or road survey, it is not possible to compute the savings that might result from the elimination of certain portions of roads and intensive maintenance on other

portions. However, it is apparent that at present the roads are maintained by other than resident users. The amount contributed in the form of direct taxes for road purposes by the inhabitants of certain of these areas, as shown by Table 21, is but a small fraction of the cost of maintaining the roads. The sections of road for which these figures are given are not used as connecting links, but are merely branches from the main highways winding through the sparsely settled sections of the townships, with either "dead ending" or returns by circuitous routes to main highways.

- TABLE 21 -

AVERAGE YEARLY EXPENDITURES FOR SEVERAL SECTIONS OF TOWNSHIP ROADS AND ROAD TAXES PAID BY LOCAL RESIDENTS-- CAMERON COUNTY 1930 - 1936

| Township Location | Number of Families Taxed | Miles of Road | Average Yearly Expenditure | Average Yearly Tax Levied | Per Cent Paid by Residents |
|---|---|---|---|---|---|
| Gibson | 11 | 13.8 | $1,380. | $22. | 1.6 |
| Gibson | 1 | 3.3 | 330. | 4. | 1.2 |
| Lumber & Portage | 1 | 4.8 | 745. | 3. | .4 |
| Totals | 13 | 21.9 | $2,455. | $29. | 1.2 |

Although no accepted minimum exists as to the amount a resident using a road should pay, it is obvious that the inhabitants using the sections of road shown in Table 21 are far from meeting their

fair share of road maintenance costs which are made necessary because of the isolated location of their homes.

When the population of an area has been depleted to such an extent that the presence of one family or of even several families is causing the maintenance of a road for their exclusive use, and the economic benefits derived from such occupancy are negligible, there seems to be a justification for the planned elimination of such situations.

One of the major causes of the high cost of township roads is the lack of proper drainage, especially in mountainous areas where it is necessary to maintain roads with excessive grades. After heavy rains and in the Spring, road washouts are frequent. Townships affected are aware of this fact, but claim sufficient funds are not available at any one time to construct adequate drainage facilities. Here again the size of the organization limits the chance for economy. On the other hand, in view of the sparseness of population, such construction may be an uneconomical investment of public funds, since in the near future the need for the road may be eliminated if present population trends continue.

## SOURCE OF REVENUE

The presence of State Land in the townships of Cameron County furnishes an important source of income for local road purposes. For every acre of State owned land within a township, the State is required by law to pay two cents* per year for road purposes in lieu of the taxes formerly received from the land prior to State acquisition. This law is

* The State pays a total of five cents per acre for all State owned land; two cents for school, two cents for road and one cent for county purposes.

beneficial and useful until the township road mileage has been reduced to such an extent that the State's contribution becomes excessive when compared to the amount necessary to administer adequately the affairs of the township. This reduction in road mileage is caused by the addition of township road to the State Highway System and, in many instances, the elimination of the need for roads by State purchase of land.

One outstanding example of the effect of this law is found in Grove Township. The income from State owned land in this Township has been sufficient during the past several years to eliminate the necessity for a levy of local taxes for road purposes.

The sources of all income for the townships in Cameron County is shown in Table 22. The averaging of receipts over a period of seven years eliminates the distortion which might result from an unusual receipt of funds from any one source during a particular year.

- TABLE 22 -

SOURCES OF TOWNSHIP RECEIPTS BY TOWNSHIPS IN CAMERON COUNTY
YEARLY AVERAGE FOR A SEVEN-YEAR PERIOD - 1930-1936

| Township | Local Taxes | Per Cent of Total | State Owned Land and Other State Assistance | Per Cent of Total | County Aid | Per Cent of Total | ** Other Sources | Per Cent of Total | Total Receipts |
|---|---|---|---|---|---|---|---|---|---|
| Gibson | $ 584. | 29.2 | $1,242. | 62.2 | $ 30. | 1.5 | $141. | 7.1 | $1,997. |
| Grove | 134. | 13.3 | 760. | 75.6 | 68. | 6.8 | 43. | 4.3 | 1,005. |
| Lumber | 446. | 26.9 | 632. | 38.2 | 364. | 22.0 | 214. | 12.9 | 1,656 |
| Portage* | 216. | 59.0 | 68. | 18.6 | 67. | 18.3 | 15. | 4.1 | 366. |
| Shippen | 5,006. | 73.1 | 870. | 12.7 | 743. | 10.9 | 228. | 3.3 | 6,847. |
| Township Totals | $6,386. | 53.8 | $3,572. | 30.1 | $1,272. | 10.7 | $641. | 5.4 | $11,871. |

* Yearly average for six years - No report for 1936 available.
** Composed of rentals and sales of machinery and buildings and several small miscellaneous items.

Gibson, Grove and Lumber townships obtained small proportions of their total receipts from local taxation. State aid for Lumber Township, however, is considerably lower than that of Gibson and Grove, but the County aid to Lumber is much higher. It should be remembered that these three townships also contributed but little support for school purposes. The question can properly be raised as to whether or not the taxes imposed are equitable in the townships of the County.

Table 23 shows the per capita income from local taxation and the State aid per mile of road.

- TABLE 23 -

PER CAPITA PAYMENT OF LOCAL ROAD TAXES AND THE STATE AID CONTRIBUTED PER MILE OF TOWNSHIP ROAD IN TOWNSHIPS OF CAMERON COUNTY - 1930-1936

| Township | Population 1930 | Average Yearly Taxes Paid | Per Capita Payment | Miles of Township Road | Average Yearly State Aid | State Aid Per Mile of Road |
|---|---|---|---|---|---|---|
| Gibson | 374 | $ 584. | $1.56 | 22.2 | $1,242. | $ 56. |
| Grove | 380 | 134. | .35 | .9 | 760. | 844. |
| Lumber | 255 | 446. | 1.75 | 10.5 | 632. | 60. |
| Portage* | 73 | 216. | 2.95 | 2.5 | 68. | 27. |
| Shippen | 1,014 | 5,006. | 4.94 | 35.5 | 870. | 25. |
| Township Totals | 2,096 | $6,386. | $3.05 | 71.6 | $3,572. | $49.89 |

* Yearly average for six years - No report for 1936 available.

It is apparent from Table 23 that the tax levy is controlled by the difference between the total funds needed and the amount supplied

by the State. This is caused by the payment by the State of the flat rate of two cents per acre without regard for actual needs. In effect, the State is encouraging continued occupancy of sparsely settled sections by such practice. Strict adherence to the law causes inequitable distribution of State aid, and in some areas obviates the necessity for any local levy for this particular form of governmental service.

No attempt has been made, in this section of the report, to estimate all the savings that could be made through the elimination of roads which are not economically justified. Enough examples have been discussed to show that, in many instances, roads are provided on a scale entirely out of line with the amount of use for them. If sufficient cause was evident for the continued occupancy of these areas, encouragement of increased occupancy would be desirable and would possibly justify the amounts expended for the roads. Since this is not the case, the State is paying for the development and maintenance of areas unsuited for settlement.

Further discussion of these problems follows in the section on recommendations and conclusions.

GOVERNMENTAL SERVICES

CAMERON COUNTY

## COUNTY

The problems discussed in the other sections of this report are, in general, County problems. As an aid in ascertaining the extent of these problems, comparisons were made between areas within the County. In order to adequately analyze the problems of the County as a whole and make recommendations, a State-wide point of view is required which would necessitate the study of many counties. Reports have been prepared by other agencies concerning the affairs of various counties. While the period covered and the scope of these reports are not entirely comparable with the data obtained for Cameron County, the following discussion is included for informative purposes.

During the past thirty years the County expenditures have increased considerably in spite of a decrease in population. The following figures show the amount expended yearly at ten year intervals:

| Year | Population | Total Expended | Per Capita Expenditure |
|---|---|---|---|
| 1900 | 7,048 | $14,017. | $1.99 |
| 1910 | 7,644 | 21,872. | 2.86 |
| 1920 | 6,297 | 32,391. | 5.14 |
| 1930 | 5,307 | 37,073. | 6.99 |

When checking the records to determine the cause of this increase, it was found that with few exceptions, the amounts expended for all items increased in about the same proportion. In comparing these per

capita cost figures with those for other counties, it was learned that the Cameron County costs are not unusually high. However, the expenditure for 1936 exceeded $42,000, an increase of approximately 13 per cent above the 1930 figure, and a close check should be maintained to prevent their becoming excessive.

The County does not maintain an almshouse. Persons eligible for poor relief are placed in the Elk County institution. The cost for this service is apportioned among and paid for by the various civil subdivisions according to the use made of the service by each subdivision. This apparently is a satisfactory arrangement and cannot be considered a problem.

County consolidations involving Cameron County have been discussed by interested persons for some years, but will hardly occur in the near future. Strong local opposition prompted by civic pride will be encountered when such moves are suggested. However, if population decline continues, it may become impossible for some counties to operate economically as county units.

## ASSESSMENT AND COLLECTION OF TAXES

When considering the problems of a County, especially those of a financial nature, the study of taxes is of major importance. The chief purpose of this report, however, was not intended to be a study of taxation, since recommendations and suggestions for important changes in the tax structure or procedure would require a much wider coverage of problems than that afforded by the study of one county. No extensive discussion or presentation of tax statistics was deemed necessary in this report, but a few statements are essential for a thorough understanding of conditions.

A study was made of the tax and assessment records from 1930 to 1935 inclusive, to determine the amount of assessed real estate valuations, the extent of tax delinquency and problems originating from this source. Much of this information was incorporated in the tables and the discussions in the preceding sections on schools and roads.

In checking the data, it was found that Cameron County presents no outstanding tax problems of major importance different from those encountered in the average county within the State. Increased delay in the payment of taxes during the recent years covered by this study was noted, but this condition has also been prevalent throughout the State and cannot be taken as a situation peculiar only to Cameron County.

The locations of individual tax-delinquent properties were plotted on a map and studied to determine if there were any marked concentrations. This graphic analysis showed that the delinquent properties were widely scattered. This is quite natural when considering

the character of the County. As was mentioned in previous sections, most people in the rural areas engage in part-time farming and must look elsewhere for a means of obtaining a cash income. Those finding no other employment, find it exceedingly difficult to obtain cash; tax delinquency results. Thus, the particular location of their homes has no significance as to the cause for the delinquency.

Cameron County avails itself of a source of income that is not used in many counties of the State. Hunting cabins situated on leased camp sites on State land are assessed and a tax is levied by all taxing bodies within the County. While the assessed valuation placed on such cabins averages only $200, the total levy is appreciable in a township where there are a large number of them. Gibson Township profits from this source to a greater extent than do the other townships of the County, but all participate to some degree in this local source of revenue.

During the years from 1933 to 1935 inclusive, Gibson Township assessed ninety-nine hunting cabins each year. The total levy on the cabins per year amounted to $815 or over 12 per cent of the total levy of the Township. While the above source of revenue is remunerative and helpful, difficulties are encountered by the assessor and the tax collector in handling this situation. The tax collections are very slow, the records showing almost 50 per cent of the 1935 taxes remaining unpaid on September 1, 1936. The tax collector is handicapped in his duties and most of the collection effort is restricted to the mailing of notices, since the cabins are only occupied during the hunting season consisting of a few weeks of the year and the greater number of owners are non-residents of the County. An attempt personally to contact the owners

during the hunting season is difficult for the collector, because of the widely scattered locations and isolation of the cabins.

If this means of revenue is to be maintained, a more aggressive procedure of tax collection must be adopted to produce the desired results. Ordinary methods, such as a tax sale of the cabins, will not prove highly successful, since the lease for the ground is not involved and permission for occupancy could not be guaranteed to a prospective buyer by the County if the delinquent owner refused to relinquish his lease with the State for the ground. A method involving seizure and holding for a limited period of time until the taxes and cost of seizure is paid, would probably better accomplish the purpose. If the taxes and costs were not paid by a certain time, the State could then cooperate by terminating the lease and acquiring the cabin for its own use, or to rent for recreational purposes. Names and addresses of all persons leasing camp sites are obtainable at the District Forester's office and assessors and tax collectors should encounter no difficulty in keeping a close up-to-date check on new and old lessees.

Among the properties listed for sale at the unseated land-tax sale of 1936, were those having unpaid taxes on them for many years past, some as long as ten and twelve years. Nothing is gained by this practice, for the incentive to buy is diminished yearly by the accumulation of unpaid taxes on these properties. It would be wise not to anticipate revenue from this source in the preparation of a budget, and its consideration as an asset is doubtful. The Department of Forests and Waters and the Game Commission are notified about such properties offered for sale.

It is not, however, always convenient for these bodies to purchase land at the time they are offered for sale and, in some instances, the land is undesirable for their purposes.

After having been carried on a sale list for a reasonable length of time, the County should acquire title to these tax-delinquent lands and maintain a separate record of them. By adopting this procedure, the land could be made available with a clear title when a governmental agency had use for them and if the County were zoned (see recommendations and conclusions), classification of these lands should be given careful consideration.

Any sparsely populated township is faced with the problem of obtaining satisfactory personnel to fill administrative offices. Eligible persons with the necessary qualifications may be scarce and many qualified to hold office may have no spare time. Even though a suitable tax collector may be elected, the small remuneration obtainable and the trouble caused by the scattered population offers little incentive for aggressive tax collection. The section following, on recommendations and conclusions, suggests changes that should help to solve these problems.

## RECOMMENDATIONS AND CONCLUSIONS

Cameron County is a good example of an area in which opportunity presents itself for intelligent group action to overcome present social and economic problems. Some of these difficulties require legislation in order to make desired steps possible. Others present their own solutions. The main difficulty is in awakening a realization of the necessity for progress and in getting an action program started by the people, for their own benefit.

### STATE PURCHASE

Continued purchase of lands for forestry and recreation by the State Department of Forests and Waters and the Game Commission is one method that can be used to solve partially some of the problems. Such purchase if carefully planned, not only has the effect of blocking out land areas and relieving the distress among certain individuals, but influences the school and road problems and other phases of local government as well. Planned and coordinated State purchase can do much to decrease isolated settlement and the high per capita costs of furnishing local government facilities. Removal of families from forest areas also tends to decrease the conflict between the particular individual and the State in the matter of damage to crops by the deer. It is important to note that unplanned land purchased by State agencies can greatly complicate the problems of the remaining inhabitants.

Purchase, however, can move but slowly. The funds for public acquisition are limited, and the prices that can be paid are not always

acceptable to the individual. Yet, if the policy of concentrating purchases to remove the isolated families were followed, more general good would result than comes from purchasing for forestry and game use only.

Policy determination and direction of public acquisition is outside the immediate control of residents of the County. Nevertheless, local wants can be made known to proper authorities and this type of remedial measure can be made to work hand in hand with other correctional measures and other phases of a program over which local residents do have or could have control. Rural zoning presents just such an opportunity.

## RURAL ZONING

Rural zoning is defined as the creation by law of districts in which regulations prohibit injurious or unsuitable structures and uses of structures and land. The regulations vary between different districts, according to the type of control desired. Zoning is but a method of applying collective control over the use of land in the interest of the public welfare; it is a development of the police power -- that broad grant of power under which governments legislate for the protection of health, morals, safety, convenience, and general welfare of the people. That power rests with the State, but can be and is given to lower political units by special grant. Laws granting counties the power to plan county development and to adopt and enforce land use zoning ordinances were passed by the 1937 session of the General Assembly. Under the provisions of the county zoning law, should Cameron or other counties decide to use it, the procedure would be as follows:

(1) The Board of County Commissioners would appoint a Zoning Commission of

three, five or seven members to draw up an ordinance. (The powers and duties of the Zoning Commission may be delegated to the County Planning Commission if one exists.)

(2) The Zoning Commission, after detailed study of the County, making use of all available data and services from local, state and federal agencies, would prepare a report recommending the establishment of appropriate land use districts with the permitted and restricted uses desirable in each district. This report would then be submitted to public hearing.

(3) The Zoning Commission would then prepare a final report and present it to the State Planning Board for advice and recommendations. After receiving these suggestions the Commission would perfect the report and transmit it back to the Board of County Commissioners.

(4) The County Commissioners would then present this proposed ordinance in public hearing, to receive the reaction of local people.

(5) The Board would then vote on the ordinance and in case of acceptance would name the effective date. Copies of the ordinance would be published in local papers, and would be put on file with the County Commissioners' Clerk and with the Register of Deeds.

(6) A list would be made of all uses not in conformity to those set up in the ordinance and this list would be filed with the ordinance.

(7) Enforcement would be a duty of the Board, but authority could be delegated to some other official.

(8) A Board of Appeals would be appointed by the Board of County Commissioners to handle any complaints arising from the effects of the ordinance.

(9) Changes or amendments of the ordinance would follow the same procedure as described above in the case of original adoption.

Zoning regulations and restrictions should be made only after careful study of the County. Thoughtful, careful planning must precede zoning. This use of the police power is only a means of attaining a desired goal; that goal is the careful and wise use of natural and human resources so as to secure the greatest good for the greatest number of persons.

Zoning under Pennsylvania laws is not retroactive. When an ordinance is adopted, existing uses contrary to the regulations are allowed to continue as before. The good that comes is not an immediate solution of all problems; rather it is prevention of an increase in those problems, and a gradual elimination of the undesirable conditions. Provision may be made in the ordinance for the gradual elimination of "non-conforming uses" so that after a period of years all land uses in all districts shall be in conformity with a set of rules and regulations the people of the county have made for the use of the resources of their own county.

Other sections of this report have pointed out certain undesirable conditions existing in population distribution, governmental services, and use of land for agricultural and recreational purposes. Zoning attempts to guide the use of land for the purpose to which it is best adapted, and over a period of time, will have more or less influence on all of the described conditions. A few brief examples will serve to illustrate what is meant and will indicate what can be accomplished by rural zoning.

To illustrate: The analysis of the school situation pointed out that Mix Run has a high cost per pupil in average daily attendance and that only 3 pupils attended the school. It also stated that the lack of a bridge was the main excuse for continuous operation of the school. Otherwise the few children could be transported elsewhere at lower cost. The analysis of land use indicated that agriculture was not lucrative on the farms in that area and that the land is better adapted to forestry. The main reason why persons continue to live across the creek is that their homes are already established there. The land offers but little inducement for residents to stay, but so long as the buildings are habitable and governmental facilities (including relief) are offered, people will continue to stay there. Such a situation causes the burden of the excessive costs of governmental services to be borne by others.

Hope has been entertained that a certain school in the County could soon be closed. However, as stated in the analysis of schools, another family with children of school age moved into the area. Now the school must be continued. Had there been a rural zoning ordinance in effect, establishing that area as a restricted use district, the family with children would not have entered the district, and this situation would have been impossible. The school could have been closed. The other families living there would not have been affected -- their uses would continue; but the balance of the County and the State would directly benefit.

Other examples are less conclusive but are just as important. In another part of the same Township there is a farm located three miles from the main macadam road, on a township dirt road which must be maintained at public expense primarily for one family. There are no children

of school age at present, but there is nothing to prevent another family with children of school age from moving into this particular area. Those children would have to be educated, either by establishing a new school or by transportation to existing schools. Were a limited use district established under a County Zoning ordinance, such a situation could not develop.

In Grove township north of U. S. Route 120 the residents are located along a macadam road. The area might well be dedicated to recreational use since it is not well adapted to crop production. If necessary, year long residence could be prohibited, but such restriction would apply only to new residents, not to those there at the time the restriction was enacted. After a period of years, transportation and other school costs would be eliminated through gradual elimination of non-conforming uses, and the relief burden would gradually disappear (the W.P.A. labor has supported many families in this section for the past few years). Yet, the land would be furnishing a greater public good than it is at present. More summer camps would be built. The stream could be improved and kept stocked for fishing. The remaining residents could furnish the services demanded by tourists, hunters, campers, and vacationers. The County would have just as great or greater tax returns from a recreational use as at present from the properties being farmed. Recreational value would be enhanced by protecting recreational facilities.

Some areas would not be restricted. In these, use could continue on as before. Some of the isolated cases could by various means be moved into such areas. It can be safely assumed that many of the farms located in the better valleys will remain there, and it is only logical that they should do so.

Other illustrations could be given, but enough has been shown to indicate how rural zoning could help overcome the problems of the County. Zoning is a democratic form of procedure -- a group action against a host of common evils -- a method calling for wise use of natural and human resources, instituted and controlled by local residents, yet working for the benefit of the State as well.

State land purchase and other measures could work hand in hand with rural zoning. It could be made the policy to purchase lands of individuals located in restricted use districts. Then the desired results would be obtained more rapidly. The County could also help the movement by exchanging county owned lands in unrestricted districts for individually owned lands in restricted use districts. In this respect it would be necessary for the County to adopt a more rigorous policy in handling tax delinquency. Seemingly past policy has been to acquire land by tax deed only when absolutely necessary; some lands have been delinquent for years, but were kept on the tax roll in the hope that eventually some payment might be made. Such a policy, although seemingly advisable in depression years, actually encourages the mis-use of land and aggravates rather than helps solve the economic and social problems.

## LOCAL GOVERNMENT

The problems discussed in the school and road sections of this report show clearly the need for a revision of laws pertaining to local government. The payment in lieu of taxes of a stipulated amount per acre by the State for State owned land, without regard for actual need, encourages perpetuation of a situation that obviously needs correction. When the State

owns the greater part of a township and the population is sparse, the State's payments to townships naturally become larger than are justified. This fosters unwise expenditures of public funds and the local inhabitants are relieved of the necessity of making just and adequate contributions for the support of their institutions.

A change in the flat rate system of payments by the State for State owned land to township organizations in lieu of taxes formerly received is desirable. It is, however, difficult to recommend a specific plan that would be applicable to the entire State without first studying conditions in other Counties. A revision in the law incorporating the requirement that proof of actual need should be furnished before payment is made, would be helpful in cases where the State owns a certain proportion of a township and there is a minimum number of inhabitants or the road mileage is low.

Permitting road and school districts to operate independently when their responsibilities are reduced below a determined minimum, increases unit costs of public function. Act No. 157 passed by the General Assembly of 1937 will aid the school situation. This Act provides for the merger of small school districts, giving them the advantages of an improved educational program and in many cases a greater chance for economical operation. The Act, however, will not remedy the situation in small attendance areas, as has been mentioned in the school section, since inaccessibility controls transportation and will not allow consolidation of such areas within districts. Zoning alone, or together with coordinated State land purchase, as mentioned previously in this section, is the only apparent remedy.

A partial solution of the road problem could be effected by a law making it mandatory for the State to assume complete control of township roads when the mileage falls below a certain minimum. The General Assembly of 1937 designated approximately 2600 miles of township road in the State to be added to the State system January 1, 1938. No Cameron County township roads were included. Where the State already contributes the major portion of funds needed for the maintenance of township roads, as is the case in several townships of Cameron County, it would be wise for the State to consider the acquisition of these roads. In view of the road construction and maintenance resources of the State Highway Department, State maintenance should be more economical, than the allotment of funds to an organization inadequately equipped with road maintaining facilities.

A more drastic change of organization could possibly be suggested, upon further study of township road conditions of other counties, by recommending that the State take over all township roads. The inclusion of all township roads in the State into State Highway districts controlled by physical characteristics instead of county or township lines, should result in increased economy and should improve the quality of the roads. This would further extend the intent of Act 51 A passed by the 1937 session of Legislature which provides an appropriation for the State maintenance of township roads for the period of two years beginning January 1, 1938.

The consolidation of various township organizations and the revisions in laws discussed throughout the report suggests the advisability of combining certain groups of townships. The report has shown there is less reason for separate existence of townshipsat the present time than there had been in the past. Declining population, speed and ease of transportation

and State acquisition of land and roads are all factors contributing to the lack of necessity for independent township operation. The second-class township law is very difficult to apply to townships which vary in population from less than 50 to nearly 20,000, especially when minimum requirements are mandatory, without causing problems in the townships where the population is sparse. With the possible exception of Shippen, all the townships in Cameron County fall in the group where economical operation is difficult if satisfactory conditions are to be maintained. The grouping of those townships in which the population falls below a certain minimum would contribute greatly to the solution of the problems.

## AGRICULTURE

Very few specific recommendations for improving agricultural conditions can be offered here. The natural handicaps under which the farmers work are such that in many instances it would be wise to attempt to devote the land to other uses. This is particularly true in the upland sections served by dirt roads. There it is unwise to build hard surfaced roads. The farms do not warrant and cannot support such service. True, if good roads were there farms would produce more, because market outlets would be facilitated, but it is also true that some areas will continue to decline whether or not hard roads are built. This statement is based on the fact that some of the areas along macadam roads are continuing to decline.

No doubt farm management practices could be improved on individual farms, but farm management is not the cure for the land use problems. It would be a wiser policy to pick out the areas that are likely to continue in agriculture and to concentrate effort in them by encouraging the use of the

best farm practices. To do the same for the declining areas will accomplish but little in actual solution of the present problems. The individual may be helped for the time being, but the problem is not solved -- it continues on, remaining to be faced by another generation. The question will have to be met and solved some time.

If present trends continue, some of these situations will handle themselves. Complete areas will be abandoned. Some of this has already occurred, but it is a slow process, increasingly painful to those who remain. Any active program is bound to be costly, but when this is balanced against present and future costs of governmental services and relief grants, it can be seen that money will, in fact, be saved by instituting remedial measures.

Some of the important relationships between farm and non-farm income were discussed in the section on family incomes and expenditures. Farm management practice on a greater number of farms might well be organized around non-farm enterprises, but this activity should not be encouraged beyond the amount of work available. Undoubtedly in the future there will be more persons employed in the woods. If such persons can also operate farms there is more likelihood of sufficient livelihood. The importance of location for these part-time farms cannot be over-emphasized. The community will gain nothing and other sections of the State are bound to lose if the number of isolated cases is increased. However, since the properties along the improved roads in the better valleys will no doubt always be occupied, it is only a wise step to make it possible for those occupants to take advantage of all opportunities to increase family earnings. In this same connection, residents of these farms can also well afford to pay even more attention to the needs of the recreation trade. If the vacationer and the

local resident can be brought closer together, each can profit by what the other has to offer.

The home market is not fully satisfied. Favorably located farms, even though the soil resources may not be so bountiful as those of more distant farms, have the advantage in producing for such markets. There is some opportunity for individuals to grow more truck and garden produce and more attention can be paid by producers to quality of goods sold. Education and extension demonstrations can put desirable practices into use, but the point again is emphasized that no long-time contribution is made if such practices are encouraged regardless of the location and natural resources of the particular farm. A more lasting contribution comes from delimiting the areas in which past practice has shown that use of land for crop production gives only a precarious existence. The use of such areas for other purposes should be encouraged. The aid in education, advice and demonstration should be concentrated in the areas that are known to be adapted to crop production. Adoption of such a policy is only exercising forethought. That is what was meant in the statement that Cameron County is a good example of an area in which there is opportunity for concentrated group effort to intelligently overcome present economic and social problems.

## RECREATION

Another means of decreasing isolation, eliminating conflict in policy, terminating expenditures for schools and roads, is to focus attention on use of land for recreational purposes. Much could be done in planning State land purchase and private purchase of land for hunting camps and summer homes. Mention has been made elsewhere that funds for State purchase are limited. It is also to be seen that the individual or group wishing to ac-

quire a camp cannot always afford to pay the owner for all of that owner's holdings. A method might be worked out whereby the State could purchase the land and some individual or group could purchase the buildings. This would work to the benefit of the present owner in giving him a greater sales price for his property, and would still work toward the end of putting land to its best use. Gradually the costs of maintaining roads could be decreased. Roads would need to be maintained only during the summer season. There would be no expense for snow removal, nor would there be continued call for extension of hard-surfaced roads for such part-time land uses.

At present the County has a problem to solve in the matter of taxing recreational developments. When an individual constructs a camp on a State owned site the structure is subject to local taxation. Many of these camps are tax delinquent. There are two problems involved: the County is in need of tax revenue, but the rates on such properties cannot be placed too high for fear of discouraging development. More care must be exercised in the assessment and collection of such taxes. The County might well develop a more rigorous policy in handling such tax delinquency, but there too, care must be exercised or the end sought will not be gained. The difficulty of policing such properties to insure non-use by tax-delinquent owners prohibits too rigorous a policy. The counties might acquire tax title to these properties and establish a system of temporary leases to transient users during the hunting season.

The County is located in a large recreation area, yet the facilities for wise use of these resources are not fully developed. Full development of the natural possibilities for recreation will be a major contribution to the solution of the problems arising from maladjustments in land use.

Not only can the community benefit by a deliberate attempt to guide land use in the interest of group rather than of individual welfare, but the individuals that remain in the area in which year-long residence is to be encouraged can also profit by giving greater attention to the uses to which the lands are naturally adapted.

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It cannot be denied that certain individuals would be adversely affected if a program of action is developed in accordance with these conclusions and recommendations. Such is always the case whenever an action or a remedial program is attempted. However, it is also to be seen that the difficulties will not solve themselves. Unless some action is taken, these problems and others will continue indefinitely, and thereby seriously affect a much greater number of individuals.

# DRAINAGE BASIN STUDY

# OF

# PENNSYLVANIA

## PART I

## DELAWARE, LEHIGH AND SCHUYLKILL RIVERS.

PENNSYLVANIA STATE PLANNING BOARD
HARRISBURG, PA.



- 1937 -

PENNSYLVANIA STATE PLANNING BOARD




928 North Third Street
Harrisburg, Pennsylvania

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG
928 North Third Street

December 31, 1937

Honorable George H. Earle, III
Governor of Pennsylvania
Harrisburg, Pennsylvania

Dear Governor Earle:

On behalf of the State Planning Board, I respectfully submit to you the three volumes of the DRAINAGE BASIN STUDY OF PENNSYLVANIA.

This report contains detailed information and data concerning Pennsylvania's water resources and problems, which had not been assembled hitherto. It is presented as a reference work for the various State Departments, Federal Agencies and Health and Water Engineers.

Sincerely yours,

Ralph M. Bashore

Ralph M. Bashore
Chairman

RMB:MH

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG

October 6, 1937

Hon. Ralph M. Bashore, Chairman
State Planning Board
Harrisburg, Pennsylvania

Dear Mr. Bashore:

The Staff of the State Planning Board herewith respectfully submits Part I of the Drainage Basin Study of Pennsylvania.

This, the first of three volumes, covers the Delaware, Lehigh and Schuylkill River Basins. Parts 2 and 3, covering the Drainage Basins in the central and western portions of the State, will be transmitted to you in the near future.

Mr. George R. Copeland, Assistant Director and Mr. James A. Patterson, Research Assistant, supervised the compilation of the data contained in this report. Mr. Patterson was also responsible for the arrangement of this material for publication.

A complete statement of the objectives of this study and acknowledgments to cooperating agencies are included in the preface.

Very truly yours,

F. A. Pitkin
Executive Director

FAP:CY

# PREFACE

Studies of the Drainage Basins in the United States were initiated by the Water Resources Committee of the National Resources Committee early in 1936, and were carried out in collaboration with the Planning Boards of the cooperating States. Water Consultants were appointed by the National Resources Committee for each major Drainage Basin. The Pennsylvania State Planning Board cooperated with the Consultants in the collection and compilation of data for these studies. The objectives of the studies were:

(1) To determine the principal water problems in the various drainage areas of the country.

(2) To outline an integrated pattern of water development and control designed to solve those problems.

(3) To present specific construction projects and investigation projects as elements of the integrated pattern or plan, with priorities of importance and time.

This report presents data and information furnished to the Water Consultants for the preparation of the National Resources Committee Report, "Drainage Basin Problems and Programs", December, 1936. Inasmuch as the report of the National Resources Committee is a summary report, most of the available detailed supporting information was not published. It is the purpose of this report to make available to the water and health engineers, and to the interested State Departments and Federal Bureaus, as reference material, the detailed information and data collected by the Pennsylvania State Planning Board.

Due to the limitations of time and personnel, it was not possible to make detailed studies of projects submitted, especially with regard to cost estimates. Some meritorious projects have undoubtedly been omitted

due to lack of information, and some others which are included may be under construction at the present time. In many cases the proposed projects for new public water supplies included no plans or cost estimates. These projects are shown on the Project Map as proposed untreated water supplies pending the receipt of information concerning the type of treatment necessary.

This report is not to be regarded as complete or final, but rather as a preliminary report, subject to corrections and refinements, from which it is hoped that a satisfactory plan for water use development in Pennsylvania may be evolved. Communications regarding corrections and additions will be welcomed by the Pennsylvania State Planning Board.

Grateful acknowledgment is made to the members of the Water Resources Sub-Committee of the State Planning Board for their generous contributions of advice and information which made these studies possible.

Further acknowledgment is made to the various State Departments and Federal Agencies for their cooperation in making available data and information.

Acknowledgment is likewise made for technical, clerical, drafting, and duplicating assistance furnished by the Works Progress Administration under the Federally sponsored project #265-6905.

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of the

Pennsylvania State Planning Board

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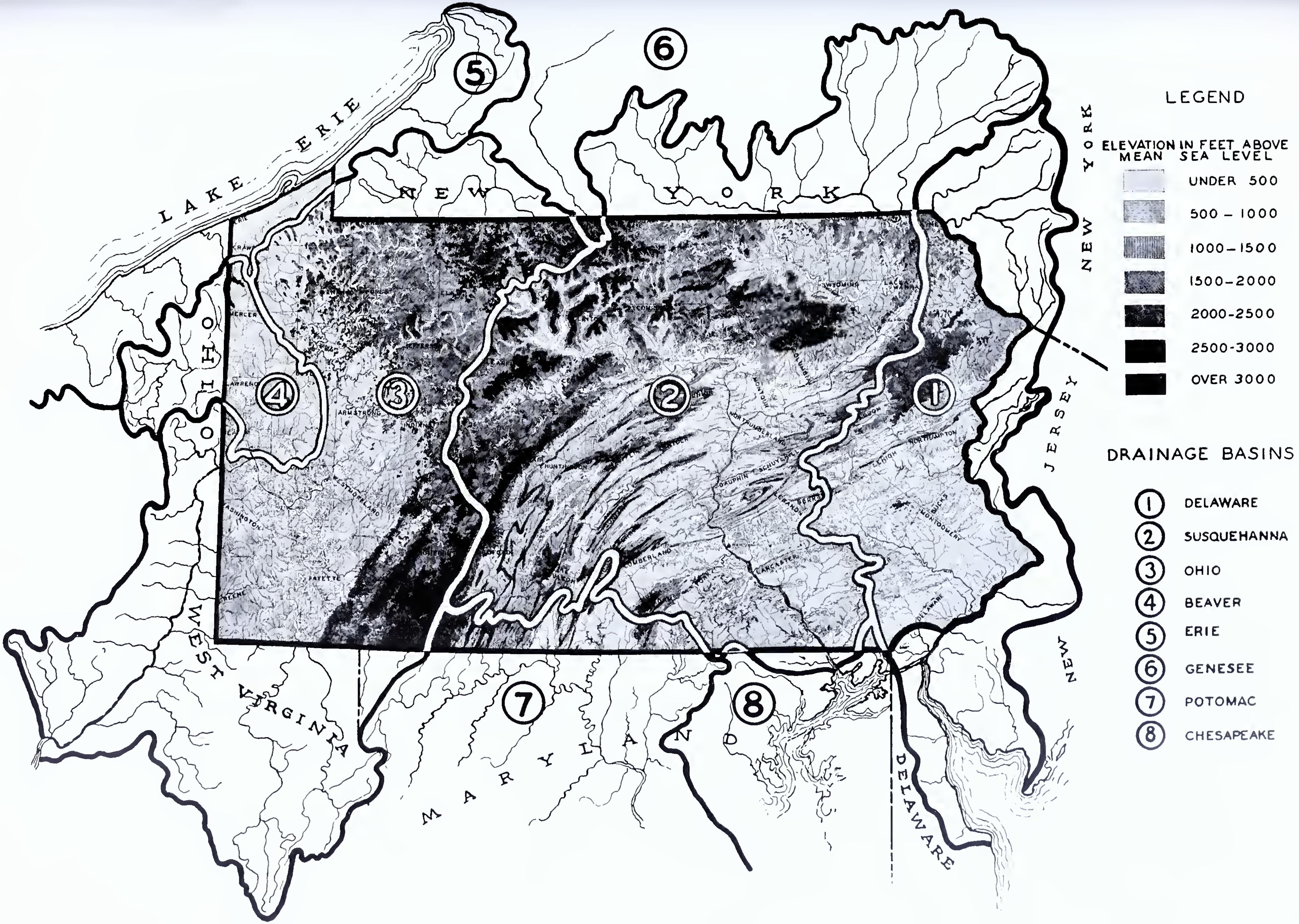
National Resources Committee Consultants and assistants in direct charge of the portion of the study dealing with Pennsylvania.

| | | |
|---|---|---|
| Delaware Basin | - | N. B. Jacobs, Regional Consultant<br>I. S. Walker, Associate Consultant<br>E. O. Goldstein, Jr. Asst. Engineer |
| Susquehanna Basin | - | N. B. Jacobs, Regional Consultant<br>M. B. Moore, Jr. Asst. Engineer |
| Upper Ohio Basin | - | F. H. Weed, Regional Consultant<br>D. E. Davis, Associate Consultant |
| Potomac Basin | - | W. M. Piatt, Regional Consultant |
| Chesapeake Basin | - | W. M. Piatt, Regional Consultant |
| Lake Erie Basin | - | L. K. Sherman, Regional Consultant |
| Genesee Basin | - | L. K. Sherman, Regional Consultant |



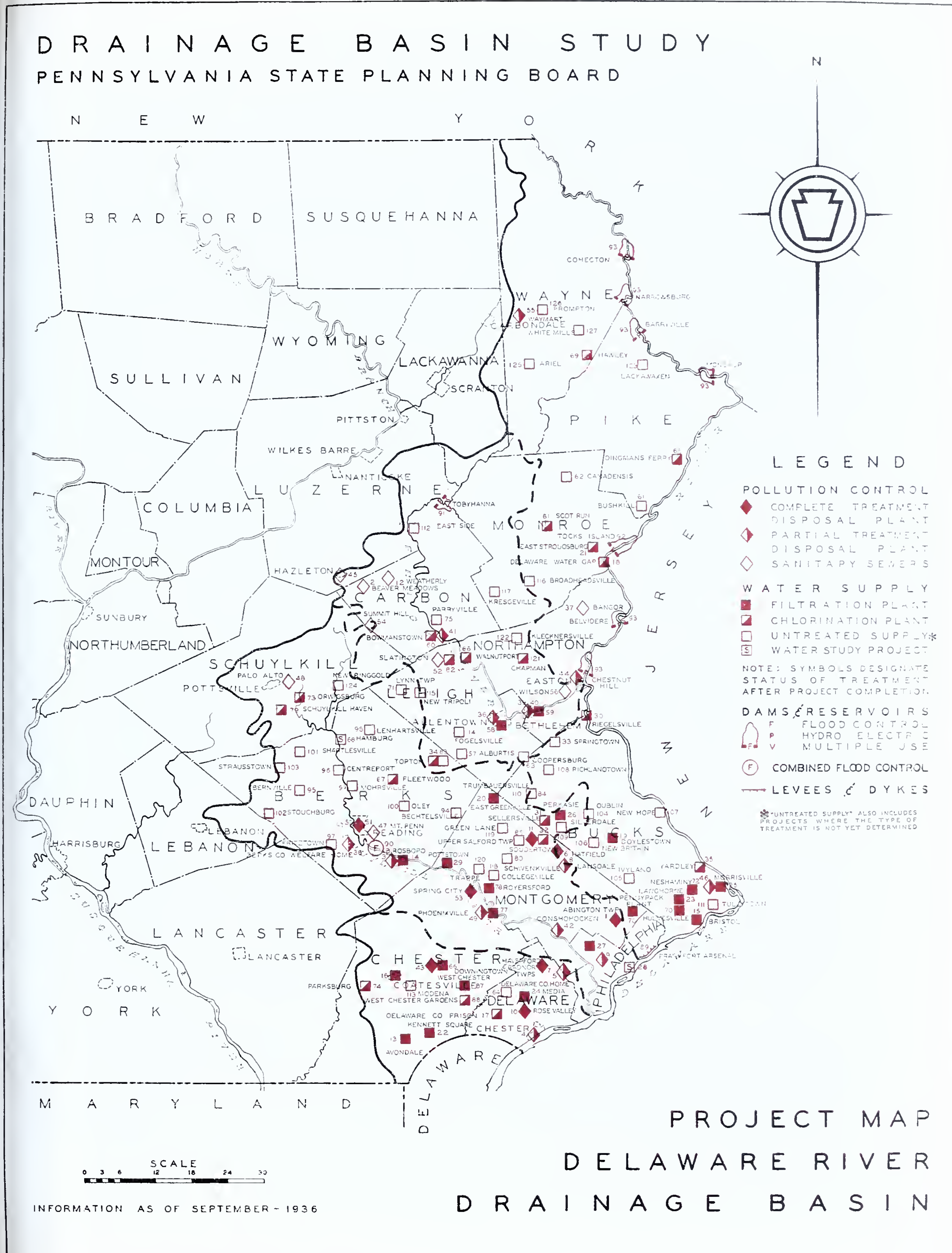

Pennsylvania's Drainage Structure

(Frontispiece)

CONTENTS

PART I

TABLES


DRAINAGE BASIN STUDY
PENNSYLVANIA STATE PLANNING BOARD
NEW YORK
BRADFORD
SUSQUEHANNA
WAYNE
WYOMING
SULLIVAN
LACKAWANNA
SCRANTON
PITTSTON
WILKES BARRE
PIKE
LUZERNE
COLUMBIA
MONTOUR
HAZLETON
MONROE
CARBON
SUNBURY
NORTHUMBERLAND
SCHUYLKILL
NORTHAMPTON
LEHIGH
ALLENTOWN
BETHLEHEM
EASTON
BERKS
READING
DAUPHIN
HARRISBURG
LEBANON
BUCKS
MONTGOMERY
LANCASTER
CHESTER
DELAWARE
PHILADELPHIA
YORK
MARYLAND
NEW JERSEY
DELAWARE
LEGEND
POLLUTION CONTROL
COMPLETE TREATMENT DISPOSAL PLANT
PARTIAL TREATMENT DISPOSAL PLANT
SANITARY SEWERS
WATER SUPPLY
FILTRATION PLANT
CHLORINATION PLANT
UNTREATED SUPPLY*
WATER STUDY PROJECT
NOTE: SYMBOLS DESIGNATE STATUS OF TREATMENT AFTER PROJECT COMPLETION.
DAMS & RESERVOIRS
F FLOOD CONTROL
P HYDRO ELECTRIC
V MULTIPLE USE
COMBINED FLOOD CONTROL
LEVEES & DYKES
*"UNTREATED SUPPLY" ALSO INCLUDES PROJECTS WHERE THE TYPE OF TREATMENT IS NOT YET DETERMINED
SCALE
0 3 6 12 18 24 30
INFORMATION AS OF SEPTEMBER - 1936
PROJECT MAP
DELAWARE RIVER
DRAINAGE BASIN

## I GENERAL DESCRIPTION OF THE DELAWARE RIVER SUB BASIN 1/

(a) Length:---Maximum approximately 156 miles (Pennsylvania portion of whole Delaware Basin.

(b) Breadth:---Maximum approximately 90 miles (Pennsylvania portion of whole Delaware Basin).

(c) Area:---Total of the entire Delaware River Basin 12,012 square miles.

Total in Pennsylvania 6,460 square miles.

Total in Pennsylvania excluding Lehigh and Schuylkill River Basins 3,171.1 square miles 2/.

(d) Physiography:---(The separation of the Lehigh and Schuylkill sub-basins for purposes of separate consideration leaves three unconnected portions designated as the Delaware Sub-basin, areas marked "1" in Figure III. These will hereafter be referred to as Upper Middle and Lower Delaware.)

1. Topography:---The Upper Basin lying within the glaciated area is mountainous and abounds in lakes and ponds. Along the eastern boundary of Wayne and Pike counties the river winds around the precipitous, jutting slopes of this high table-land, and finally emerges into a broad open valley. The stream cuts through Kittatinny Range at Delaware Water Gap, and continues obliquely across the Appalachian Plain to South Mountain below Easton. Thence to Trenton the River is bordered by alternating hills and valleys, below which it drains the low, gently rolling agricultural land of the Piedmont Plateau.

2. Geology:---In the mountainous region the formation is principally

1/ Source:-Paragraphs (a) and (b) Scaled from Stream Map of Pa.-6 miles= 1 inch. Paragraphs (c) and (d) Water Resources Inventory Report, Part III - Gazetteer of Streams. Pennsylvania Water Supply Commission, Harrisburg, Pa. 1916. Paragraph (f) Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pa. Dec. 1934. P. 71.

2/ Where mentioned hereafter except as noted the term Delaware Basin will refer to the portion in Pennsylvania, exclusive of Lehigh and Schuylkill Basins.

shale and sandstone, containing deposits of anthracite coal and glacial drift. This region contains many lakes and ponds, most of which are natural pools. Below the mountains shale and limestone formations predominate down to Easton; thence to its mouth the stream cuts through trap, sandstone and gneiss formations.

3. Channel:---Above Trenton the stream is generally swift and shallow, flowing over a rocky bed with numerous riffles separating pools; the rugged hills which flank the stream rise abruptly from the water in many places, while in other places bottom lands obtain. At Trenton an 8 foot fall occurs which limits the tidal effect extending to this point.

4. Profile:---The rate of fall per mile; from Hancock to Port Jervis, 70.5 miles is 6.8 feet per mile; thence to 7 miles above Trenton, elevation 20, 115 miles, 3.5 feet per mile; thence 62.5 miles to Delaware Boundary.

The following table gives elevation at various points with distances above the Pennsylvania-Delaware State Line.

| LOCATION | DIST. MILES | ELEVATION ABOVE SEA LEVEL |
|---|---|---|
| State Line Pennsylvania-Delaware | 0.0 | * |
| Trenton, New Jersey; P.R.R. Bridge | 55.5 | * |
| Point Pleasant | 79.0 | 73 |
| Easton | 106.0 | 157 |
| Delaware Water Gap | 135.5 | 290 |
| Port Jervis, New York | 177.5 | 418 |
| Hancock, New York | 248.0 | 895 |
| Northern Pennsylvania-New York State Line | 255.0 | 980 |

* Tidewater

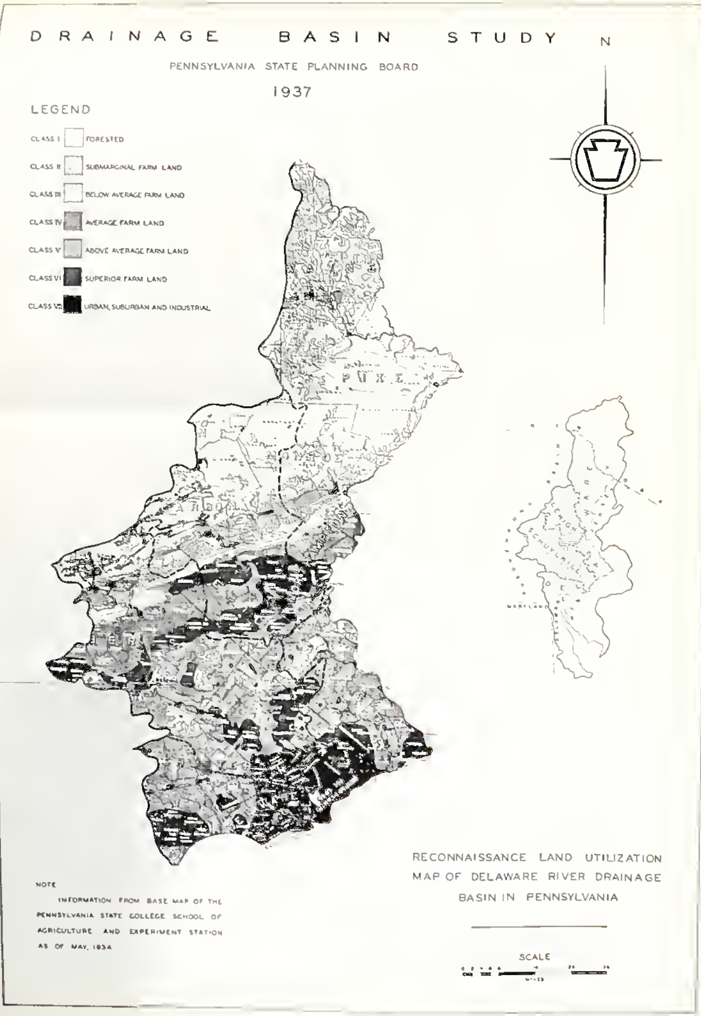

DRAINAGE BASIN STUDY
PENNSYLVANIA STATE PLANNING BOARD
1937
N
LEGEND
CLASS I FORESTED
CLASS II SUBMARGINAL FARM LAND
CLASS III BELOW AVERAGE FARM LAND
CLASS IV AVERAGE FARM LAND
CLASS V ABOVE AVERAGE FARM LAND
CLASS VI SUPERIOR FARM LAND
CLASS VII URBAN, SUBURBAN AND INDUSTRIAL
PIKE
MONROE
LEHIGH
SCHUYLKILL
RECONNAISSANCE LAND UTILIZATION MAP OF DELAWARE RIVER DRAINAGE BASIN IN PENNSYLVANIA
NOTE
INFORMATION FROM BASE MAP OF THE PENNSYLVANIA STATE COLLEGE SCHOOL OF AGRICULTURE AND EXPERIMENT STATION AS OF MAY, 1934
SCALE

FIGURE II

TABLE I

APPROXIMATE FOREST AND CLEARED LAND CLASSIFICATION BY WATERSHEDS

DELAWARE DRAINAGE SUB-BASIN IN PENNSYLVANIA

| CLASSIFICATION | Area above Easton | | Area below Easton | | Total Area | |
|---|---|---|---|---|---|---|
| | Acres | Percentage | Acres | Percentage | Acres | Percentage |
| Forested | 675,000 Acres | 57% | 146,000 Acres | 17% | 821,000 Acres | 40% |
| Cleared | | | | | | |
| Non-farm | 50,000 Acres | 4% | 48,000 Acres | 6% | 98,000 Acres | 5% |
| Farms | 325,000 Acres | 28% | 522,000 Acres | 61% | 847,000 Acres | 42% |
| Urban, R.R., Highways, etc. | 127,000 Acres | 11% | 137,000 Acres | 16% | 264,000 Acres | 13% |
| Total Land* | 1,177,000 Acres | 100% | 853,000 Acres | 100% | 2,030,000 Acres | 100% |

* Excludes Lehigh and Schuylkill watersheds and area of water in the largest rivers. U. S. Census "Land Area".

Note: Prepared from "County Area" data in the files of the Department of Forests and Waters, assuming parts of counties in watershed have same proportion of each land class as the entire county.

(e) Cover:---See Reconnaissance Land Use Map (Fig. II). Table I shows the proportion of various types of cover in the Basin.

(f) Climate:---The average annual precipitation within the Delaware Watershed varies from slightly less than 40 inches in restricted sections of the lower watershed to more than 50 inches on extensive ridge areas among the headwaters. Very little snow falls in the southern portion of the Basin after April 1st, and in November the snows are generally light and do not remain long on the ground. The average annual snowfall at Philadelphia is about 23 inches, the ground being covered with snow an average of 28 days during the winter season.

Temperatures of $100^{\circ}$ or higher are seldom recorded, but relatively high humidity sometimes makes the temperature oppressive. During the hottest periods in summer the wind movement is generally light and affords very little relief. The winters in the southern portion are mild, there being an average of less than 100 days with the minimum temperature below the freezing point, while zero temperatures are not reached more than two or three times during a winter season. The summer mean in the extreme southern portion is about $73^{\circ}$, and the winter mean is about $32^{\circ}$, while the northern portion has a summer mean of about $66^{\circ}$ and a winter mean of about $23^{\circ}$.

The prevailing winds are from the northwest in winter and the southwest in summer, and the wind movement is generally light or moderate.

## II HUMAN OCCUPANCY

In 1930, the Delaware Sub-Basin within Pennsylvania had a population of 554,635 persons 3/. This comprised nearly 6 per cent of the population of Pennsylvania and 0.5 per cent of the population of the United States.

The average density of population was 175 per square mile in 1930.

Fig. III shows the distribution of population for the Delaware Basin for 1930.

(a) Cities and Towns:---Information regarding the number, classification by population, size and rate of development, and general character of cities and towns of the Basin is given in tables II and III.

(b) Rural Development:---

1. Agricultural: 4/---

The northern part of the Upper Delaware is in the Northeastern Dairy Region, while the southern part of this section forms the major portion of the Pocono Resort Area. This portion is largely forested as shown by the Land Use Map (Fig. II). The Middle Delaware section includes most of Bucks County and is in the Penn's Manor Dairy and Poultry region, with its southern tip in the Philadelphia Truck Crop Area. The Lower Delaware section comprising parts of Chester and Delaware Counties is in the Quaker Dairy Region and contains the Chester County mushroom area as well as a

---

3/ Based on U. S. Census 1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each basin is estimated as proportional to area. Towns on the line are placed in one Basin or the other.

4/ Preliminary Report Pennsylvania State Planning Board - Harrisburg, Pennsylvania December 1934. Page 106.

TABLE II

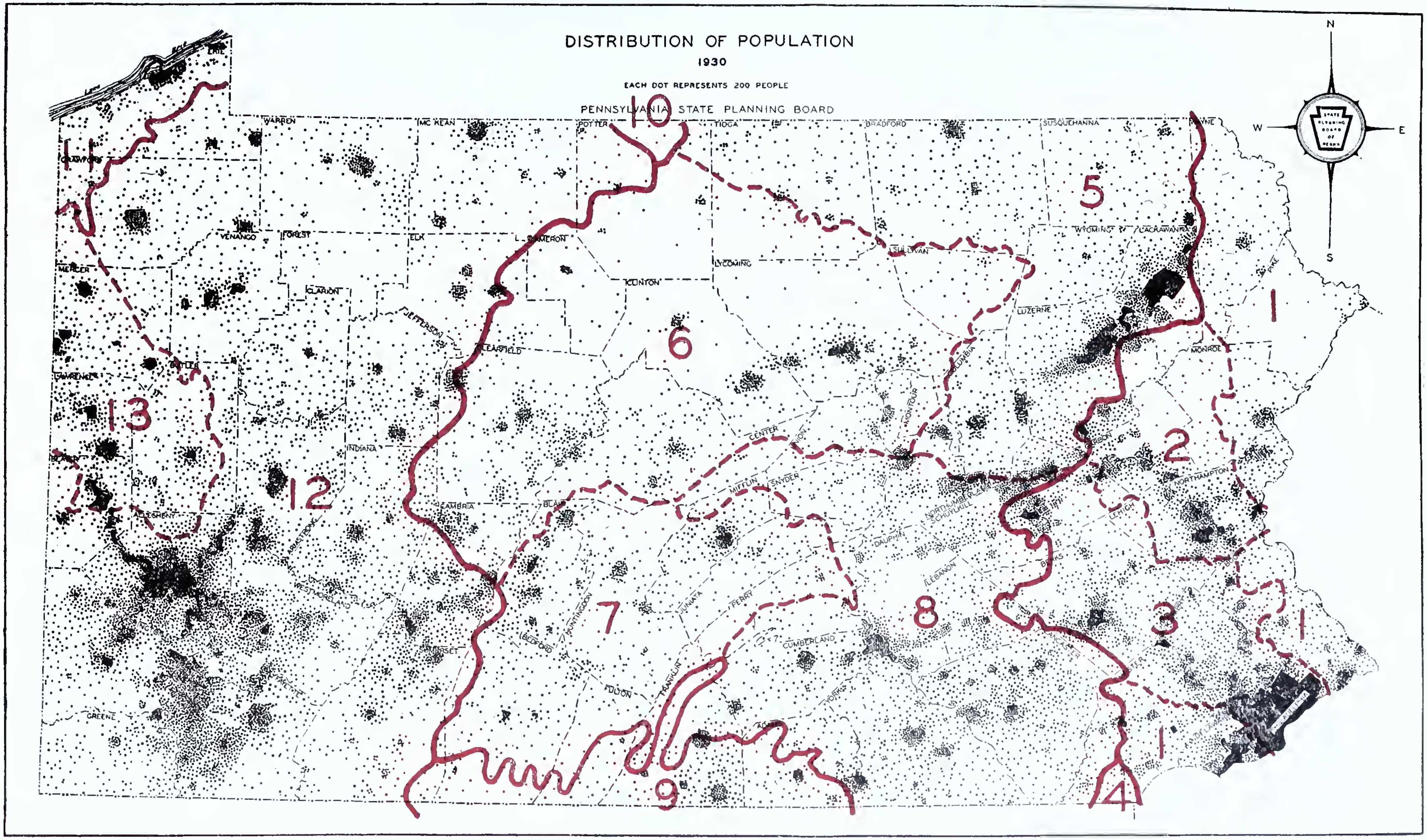
POPULATION CLASSIFICATION OF DELAWARE BASIN IN PENNSYLVANIA

(EXCLUSIVE OF SCHUYLKILL AND LEHIGH BASINS)

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 | | U.S. CENSUS 1930 | | | ESTIMATED 1934 ** | | | Population Change 1900 -- 1930 | | Population Change 1930 -- 1934 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Population | Per Cent of Total Basin | Population | Per Cent of Total Basin | Per Cent of Community Pop. | Population | Per Cent of Total Basin | Per Cent of Community Pop. | Number | Per Cent | Number | Per Cent |
| CITIES & BOROS 50,000 to 100,000 | 1 | 33,990 | 9.6 | 59,164 | 10.7 | 14.9 | 55,105 | 9.4 | 13.9 | + 25,174 | + 74.1 | - 4,059 | - 7.4 |
| 25,000 to 50,000 | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 10,000 to 25,000 | 3 | 22,344 | 6.3 | 38,706 | 7.0 | 9.8 | 38,499 | 6.6 | 9.7 | + 16,362 | + 73.2 | - 209 | - .5 |
| 5,000 to 10,000 | 12 | 27,461 | 7.8 | 77,404 | 14.0 | 19.6 | 80,645 | 13.9 | 20.4 | + 49,943 | +181.9 | + 3,241 | + 4.2 |
| 2,500 to 5,000 | 15 | 23,030 | 6.5 | 58,134 | 10.4 | 14.7 | 60,306 | 10.4 | 15.3 | + 35,104 | +152.4 | + 2,172 | + 3.7 |
| Under - 2,500 | 49 | 38,440 | 10.8 | 52,024 | 9.4 | 13.1 | 50,637 | 8.7 | 12.8 | + 13,584 | + 35.3 | - 1,387 | - 2.7 |
| TOTAL CITIES & BOROS | 80 | 145,265 | 41.0 | 285,432 | 51.5 | 72.1 | 285,192 | 49.0 | 72.1 | +140,167 | + 96.5 | - 240 | - .1 |
| TOWNSHIPS | | 208,995 | 59.0 | 269,203 | 48.5 | -- | 296,966 | 51.0 | -- | + 60,208 | + 28.8 | +27,763 | +10.3 |
| Unincorporated Villages | | | | *110,377 | 19.9 | 27.9 | 110,377 | 19.0 | 27.9 | -- | -- | -- | -- |
| Scattered | | | | 158,826 | 28.6 | -- | 186,589 | 32.0 | -- | -- | -- | +27,763 | +17.5 |
| Total Population Residing in Communities | | -- | -- | 395,809 | 71.4 | 100.0 | 395,569 | 68.0 | 100.0 | -- | -- | - 240 | - .1 |
| GRAND TOTAL DELAWARE SUB-BASIN | | 354,260 | 100.0 | 554,635 | 100.0 | -- | 582,158 | 100.0 | -- | +200,375 | + 56.6 | +27,523 | + 5.0 |

* 1934 Estimate by Rand McNally and Company.
** Estimate by Pennsylvania State Planning Board.

(1900 Per Cent Population of Pennsylvania 5.6 - of U.S. - .5)
(1930 Per Cent Population of Pennsylvania 5.8 - of U.S. - .5)




| DELAWARE BASIN | SUSQUEHANNA BASIN | 10. GENESEE BASIN |
|---|---|---|
| 1. DELAWARE | 5. NORTH BRANCH | 11. ERIE BASIN |
| 2. LEHIGH | 6. WEST BRANCH | OHIO BASIN |
| 3. SCHUYLKILL | 7. JUNIATA | 12. UPPER OHIO |
| 4. CHESAPEAKE BASIN | 8. LOWER SUSQUEHANNA | 13. BEAVER |
| | 9. POTOMAC BASIN | |

## DRAINAGE BASINS

SHOWN IN THEIR RELATION
TO DISTRIBUTION OF POPULATION
AS OF 1930

SEPTEMBER - 1937

FIGURE III

TABLE III

CLASSIFICATION OF CITIES AND BOROUGHS IN DELAWARE BASIN IN PENNSYLVANIA

(EXCLUSIVE OF SCHUYLKILL AND LEHIGH BASINS)

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant * type of Industry |
|---|---|---|---|---|
| 50,000 to 100,000 (1) | | 59,164 | 74.1 | |
| Chester | Delaware | 59,164 | 74.1 | M |
| 10,000 to 25,000 (3) | | 38,706 | 73.2 | |
| Bristol | Bucks | 11,799 | 66.1 | M |
| Coatesville | Chester | 14,582 | 154.9 | M |
| West Chester | Chester | 12,325 | 29.4 | A & M |
| 5,000 to 10,000 (12) | | 77,404 | 181.9 | |
| Morrisville | Bucks | 5,368 | 291.5 | M |
| Clifton Heights | Delaware | 5,057 | 117.0 | M |
| Collingdale | " | 7,857 | 1203.0 | Residential |
| Darby | " | 9,899 | 188.7 | M |
| Lansdowne | " | 9,542 | 262.8 | Residential |
| Media | " | 5,372 | 74.7 | A & M |
| Yeadon | " | 5,430 | 688.1 | Residential |
| East Stroudsburg | Monroe | 6,099 | 130.3 | M |
| Stroudsburg | " | 5,961 | 72.8 | T & M |
| Bangor | Northampton | 5,824 | 41.8 | M |
| Nazareth | " | 5,505 | 138.9 | M |
| Honesdale | Wayne | 5,490 | 91.7 | M |
| 2,500 to 5,000 (15) | | 58,134 | 152.4 | |
| Doylestown | Bucks | 4,577 | 50.9 | M |
| Quakertown | " | 4,883 | 62.0 | M |
| Dowingtown | Chester | 4,548 | 113.2 | M |
| Kennett Square | " | 3,091 | 103.9 | M |
| East Lansdowne | Delaware | 3,168 | -- | Residential |
| Glenolden | " | 4,482 | 413.4 | Residential |
| Marcus Hook | " | 4,867 | 302.6 | M |
| Norwood | " | 3,878 | 201.6 | Residential |
| Prospect Park | " | 4,623 | 340.3 | Residential |
| Ridley Park | " | 3,326 | 172.0 | Residential |
| Sharon Hill | " | 3,825 | 261.5 | Residential |
| Swarthmore | " | 3,405 | 277.1 | Residential |
| Upland | " | 2,500 | 17.3 | M |
| Hatboro | Montgomery | 2,651 | 222.1 | M |
| Pen Argyl | Northampton | 4,310 | 54.8 | T & M |
| Total under 2,500 (49) | | 52,024 | 35.3 | |
| Total all Cities and Boroughs (80) | | 285,432 | 96.5 | |

* A - Agriculture (M) - Mining T - Transportation M - Manufacturing.

part of the Philadelphia Estate Region.

Study of the Land Use Map (Fig. II) will indicate that the Middle and Lower sections of the Basin are largely composed of "above average" and "superior" farm land, with small scattered areas of woodland.

The following table gives statistics pertaining to counties mainly within the Basin and shows trends in Agricultural Development. The trend has been downward from 1900 to 1930 but shows a slight reversal for the past 5 years. The farm population for the area involved was 76,875 in 1930. This increased to 84,040 in 1935. It will be noted that the per cent of land in farms increased less than 1 per cent during this period and that the trend with reference to land in farms in Pennsylvania continued downward.

TABLE IV

Number of Farms and the Amount of Land in Farms for Counties Located Mainly in the Delaware Sub Basin

| Year | No. of Farms | Land in Farms (Acres) | Per Cent of Total Area | Per Cent of Farm Land In Penna. |
|---|---|---|---|---|
| 1900 | 20,800 | 1,656,476 | 74.5 | 8.6 |
| 1910 | 19,532 | 1,612,445 | 72.5 | 8.7 |
| 1920 | 18,099 | 1,499,702 | 67.4 | 8.5 |
| 1925 | 17,333 | 1,330,119 | 59.8 | 8.2 |
| 1930 | 14,414 | 1,211,998 | 54.5 | 7.9 |
| 1935 | 15,743 | 1,231,134 | 55.3 | 7.8 |

Source:-Census of Agriculture -- U. S. Department of Commerce.

2. Industrial (decentralized):---The major decentralized industries of the Basin include the production of textile products, stone, food products, and a little anthracite coal. Recreation is an important industry.

3. Mining (including petroleum):---Anthracite coal mining is relatively unimportant in this Basin, there being only two operating mines, which are located in Wayne County. The quarrying of flagstone and curbstones in Pike County is important. Crushed stone and building stone is also quarried in the Basin.

4. Lumbering:---The lumbering industry which reached its peak in Pennsylvania in 1900 has been declining since that time and at present is relatively unimportant in the State although it remains a potential industry for the future. As indicated by the Land Use Map (Fig. II) there is considerable forest land in the northern part of the Basin which under "sustained yield" development might play a part in the rejuvenation of lumbering.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies under Sections (a) and (b).

1. Cities and Towns:---Study of Table II indicates the rapid growth of cities and boros in the Basin which more than doubled in population between 1900 and 1930 but which as a group showed a slight loss between 1930 and 1934. The township population has increased, but to a lesser degree. There has been some tendency for the population to draw together in communities but over half the population still lives in the townships. The Upper Delaware Section is largely a resort area and since it contains a large share of the State's natural lakes it should continue to develop in this use. While there may be a decrease in permanent population, the future of cities and boros in this region as recreation centers seems to be

assured. In the Middle and Lower Sections of the Basin which are adjacent to Philadelphia the cities and boros would likewise be expected to continue to thrive and develop.

2. Agriculture:---Trends in agricultural development shown in Table IV indicate as would be expected the reverse of those showing development of cities and towns, - a dropping off in number of farms, and area of farm land. This is in line with improved agricultural production methods and the consequent decrease in needed acreage and manpower despite increasing production. The reversal in trend during the past 5 years is believed to be temporary and is probably accounted for by the fact that much land formerly abandoned as incapable of producing an adequate return is now occupied by persons forced to leave the cities by depressed industrial conditions.

As may be seen on the Reconnaissance Land Utilization Map (Fig. II) there are large areas of "below average" and "submarginal" farm land in the upper part of the Delaware Sub-Basin.

The Pennsylvania State Planning Board is now engaged in a study of land use by means of which it hopes to determine which areas may be made more serviceable to the people of the State by withdrawing them from agricultural use. While this study has not yet progressed far enough to provide the limits of such areas it is believed that much of the land classified as "submarginal " and "below average" on the Land Utilization Map will fall in this category. It would appear that most of the land so withdrawn could best be utilized by being reforested.

Should such a program be carried out it is probable that the now decadent lumbering industry would be rejuvenated and perpetuated on a "sustained yield" basis.

3. <u>Industry:</u>---No detailed study of industrial trends in the State has been made and consequently no definite statements concerning the matter can be made.

In general however industry except for recreation is relatively unimportant on the Upper Delaware section of the Basin, and it is not likely to become important. The recreation industry in the Pocono Mountain Resort section will probably continue to flourish.

The Middle and Lower Delaware sections in Bucks, Chester and Delaware Counties contain well developed and widely diversified manufacturing industries which, being advantageously located with reference to transportation and distribution centers, are expected to continue to develop in the future.

Development comparable to that of the past thirty years is not expected however.

(d) <u>Transportation Facilities:</u>---

1. <u>Waterways:</u>---See section IV - (a).

2. <u>Highways:</u>---A system of well paved highways traverses the Basin in all directions connecting all population centers and providing adequate transportation facilities for motor vehicles.

3. <u>Railroads:</u>---The principal railroads which operate lines in the Basin are:

| | |
|---|---|
| Erie<br>Delaware & Lackawanna<br>Lehigh Valley<br>Lehigh & New England | Upper Delaware Basin |
| Pennsylvania<br>Philadelphia & Reading<br>Baltimore & Ohio | Middle and Lower Delaware Basin |

In addition to the above, several smaller lines operate in the Basin.

All the population centers have adequate railroad facilities. In the northern portion of the Basin which is mountainous and sparsely settled there are relatively few railroads.

4. Airports:---The United States Department of Commerce, Airway Bulletin Number 2, September 1, 1934 lists 11 commercial or municipal airports lying in the Basin. The same bulletin lists one Naval airport and a seaplane port in the vicinity of Philadelphia.

## III STREAMS OF THE BASIN 5/

(a) DELAWARE RIVER. Main Stream.

1. Source:---The East and West Branches of the Delaware River rise on the western slopes of the Catskill Mountains in the State of New York, at an elevation of about 1,900 feet and unite at Hancock, New York, on the Pennsylvania and New York boundary, to form the main stream; elevation 895.

2. Course:---Southwesterly and southeasterly to Port Jervis, New York; thence southwesterly to Easton; thence southeasterly to 5 miles below Trenton, New Jersey; thence southwesterly to Delaware Bay.

3. Length:---Total 375 miles:---In Pennsylvania; West Branch, 7 miles; main stream, 248 miles.

4. Drainage Area:---Total 12,012 square miles. For description see I - (d).

5. Discharge:---Gaging station at Trenton, New Jersey. Drainage Area above station 6,796 miles.

| | | |
|---|---|---|
| Mean Annual Discharge (23 yrs.) | 1.68 | c.s.m. |
| Maximum Discharge (1913-1936) March 19, 1936 | 33.5 | c.s.m. |
| Minimum Discharge (1913-1936) September 18, 1932 | 0.179 | c.s.m. 6/ |

5/ Source for all streams except discharge data - Water Resources Inventory Report, Part III, Gazetteer of Streams. Pennsylvania Water Supply Commission - Harrisburg, Pa. 1916. Discharge data:-Pennsylvania Department of Forests & Waters and U.S. Geological Survey. - Harrisburg, Pennsylvania. Note:---Figures on Maximum Discharge in March 1936 are advance unpublished data. "c.s.m." means Cubic Feet per Second per Square Mile of Drainage Area.

6/ Flow in canals not included.

(b) Lackawaxen River Tributary to Delaware River

1. Source:---Formed by junction of West Branch and Waymart Branch at Prompton, central Wayne County; elevation 1,090.

2. Course:---Southeasterly to Hawley; thence easterly into Pike County to Delaware River.

3. Length:---Twenty-seven miles along stream.

4. Drainage Area:---Contains 602.8 square miles embracing portion of Wayne, Lackawanna, Monroe and Pike Counties of broken, mountainous country containing numerous small lakes, ponds and swamps. The main valley is narrow and flanked with steep, high hills which are well-wooded. The Basin lies within the glaciated area with its drift deposits over shale and sandstone formations. The channel is sinuous, over a rocky bed between steep banks; in a deep gorge with cascades in lower course.

Rate of fall: from source to mouth; 18.3 feet per mile.

5. Discharge:---Gaging station at West Hawley.

Drainage Area above station - 206 square miles.

| | | |
|---|---|---|
| Average Discharge (1924-1934) | 1.69 | c.s.m. |
| Maximum Discharge (March 18, 1936) | 68.0 | c.s.m. |
| Minimum Discharge (September 23, 1929) | .073 | c.s.m. |

(c) Wallenpaupack Creek Tributary to Lackawaxen River

1. Source:---In Pocono Plateau, Coolbaugh Township northwestern Monroe County.

2. Course:---Northeasterly to Lackawaxen River, being Wayne - Pike County boundary from 2 miles below source to mouth.

3. Length:---Twenty-eight miles along stream.

4. Drainage Area:---Contains 239.6 square miles of broken, mountainous country containing many lakes and swamps of glacial origin.

5. Geology:---Shale and sandstone formations; glacial drift. The channel is sinuous through a rock defile at Ledgedale, entering an old buried valley thru which it winds for 12 miles, thence over cascades, including Paupack Falls.

6. Discharge:---Gaging station at Wilsonville.

Drainage Area above station 228 square miles.

| | | |
|---|---|---|
| Average Discharge (1913-1922, 1925-34) | | 1.66 c.s.m. |
| Maximum Discharge | No record. | |
| Minimum Discharge | | 0 c.s.m. |

(d) Shohola Creek — Tributary to Delaware River

1. Source:---In Pocono Mountains; Palmyra Township; West Pike County.

2. Course:---Northeasterly to Delaware River.

3. Length:---25 miles along stream.

4. Drainage Area:---Contains 84.1 square miles of broken, mountainous country containing glacial lakes and swamps in Upper Basin; the main valley becomes narrow below Shohola Falls; well wooded. Good storage sites exist in Upper Basin. The channel is sinuous through glacial drift in upper course; through a sandstone gorge, with vertical banks 300 feet high, from Shohola Falls to mouth.

Rate of fall per mile; from elevation 1,140 to 1,040, 0.5 mile, 200 feet (Shohola Falls); thence to mouth, 9 miles, 53.1 feet.

5. Discharge:---Gaging station at Shohola, Pennsylvania.

Drainage Area above station 81.8 square miles.

| | |
|---|---|
| Average Discharge (1903-1929) | 1.81 c.s.m. |
| Maximum Discharge | Not available. |
| Minimum Discharge | Not available. |

(e) Big Bushkill Creek — Tributary to Delaware River

1. Source:---Peck's Pond, in Blooming Grove and Porter Townships, southern central Pike County.

2. Course:---Southwesterly and southeasterly to Delaware River.

3. Length:---Twenty-two miles along stream.

4. Drainage Area:---Contains 149.2 square miles of broken, mountainous country containing many lakes and swamps of glacial origin; well wooded. The channel is sinuous thru shale and sandstone formations and glacial drift; many cascades in course, and in a rocky gorge from Resseca to junction of Saw Creek, widening thence to mouth.

5. Discharge:---Gaging station at Shoemaker, Pennsylvania.

Drainage Area above station 117 square miles.

| | |
|---|---|
| Average Discharge (1908-16, 1920-34) | 1.99 c.s.m. |
| Maximum Discharge (July 24, 1920) | Not determined. |
| Minumum Discharge (September 21,26, 1932) | 0.034 c.s.m. |

(f) Broadheads Creek — Tributary to Delaware River.

1. Source:---In Pocono Mountains, Barrett Township, northeastern Monroe County.

2. Course:---Northeasterly into Pike County; thence southerly into Monroe County to Stroudsburg; thence easterly to Delaware River.

3. Length:---Twenty-nine miles along stream.

4. Drainage Area:---Contains 285.0 square miles of broken, mountainous country containing lakes and swamps of glacial origin; well wooded. The channel is sinuous thru a narrow valley of shale and sandstone formations and glacial drift, being a rocky gorge in places and having rapids and falls.

5. Discharge:---Gaging station established at Anolomink, Septem-

ber 1908; discontinued October 1913. Records are not available.

(g) Tohickon Creek — Tributary to Delaware River

1. Source:---In Springfield Township, northwestern Bucks County; elevation 638.

2. Course:---Southeasterly to Delaware River.

3. Length:---Twenty-eight miles along stream.

4. Drainage Area:---Contains 112.1 square miles of rolling agricultural country, extensively developed; broad valley with gently sloping sides; basin in Piedmont Plateau. The channel is sinuous thru shale and sandstone formations containing intrusions of trap rock; in a ravine for last 4 miles. Rate of fall from source to California, elevation 500, 3 miles, 46 feet per mile: thence to mouth, 25 miles, 17.1 feet.

5. Discharge: 7/---Gaging station at Point Pleasant, Pennsylvania.

Drainage Area above station - 107.3 square miles.

| | |
|---|---|
| Average Discharge (24 yrs.) | 1.87 c.s.m. |
| Maximum Discharge (September 27, 1907) | 38.38 c.s.m. |
| Minimum Discharge | No record |

(h) Neshaminy Creek — Tributary to Delaware River

1. Source:---Formed by junction of North and West branches at Chalfont, New Britain Township, Bucks County. Elevation 232.

2. Course:---Southeasterly to Delaware River.

3. Length:---Thirty-eight miles along stream.

4. Drainage Area:---Contains 236.5 square miles of rolling agricultural country in Piedmont Plateau. The channel is tortuous through red shale and sandstone formations containing intrusions of trap rock. Rate of

7/ Data not available from source given in Footnote No. 5. It was obtained from House Document 486 - 71st Congress 2nd Session. Report of Corps of Engineers on Tohickon Creek - Pages 7-11.

fall per mile, - from source to elevation 100, 18.5 miles, 7.5 feet; thence to elevation 20, 13 miles, 6.2 feet; thence 6.5 miles to mouth.

5. Discharge:---Gaging Station established near Rushland, June 1884; discontinued December 1913. Records not available.

(i) Brandywine Creek Tributary to Delaware River

1. Source:---Formed by junction of East and West branches in East Bradford and Pocopson Townships, Chester County; elevation 178.

2. Course:---Southeasterly into State of Delaware to Delaware River.

3. Length:---9.5 miles along stream in Pennsylvania.

4. Drainage Area:---Contains 301.0 square miles in Pennsylvania of rolling agricultural country of the Piedmont Plateau. The main valley becomes narrow in the State of Delaware and is flanked with steep hills 200 to 300 feet high. The upper Basin has red shale and sandstone formations with intrusions of trap rock; then the stream flows through a narrow belt of limestone and a wide belt of slate into a broad gneiss formation.

5. Discharge:---Gaging station at Chadds Ford, Pennsylvania.

Drainage Area above station 287 square miles.

| | | |
|---|---|---|
| Average Discharge (1911-34) | 1.29 | c.s.m. |
| Maximum Discharge (March 5, 1920) | 106 | c.s.m. |
| Minimum Discharge (December 11, 13, 23, 1932) | 0.174 | c.s.m. |

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENT

(a) Navigation: 8/---The Delaware Sub-Basin was formerly served by 5 canals, 4 of which have been abandoned. The Delaware River was formerly connected with New York Bay by the Delaware and Raritan Canal and with Chesapeake Bay by a private lock canal. The use of the former canal has been discontinued while the latter was acquired by the United States and converted into a sea level canal having a depth of 12 feet and a bottom width of 90 feet.

The Delaware River has been improved for navigation by the United States, from its mouth to the head of tidewater at Trenton, N.J. The depths at mean low water are:- 35 feet from the bay to Allegheny Ave., Philadelphia; 28 feet to Delair, N.J.; 20 feet to Trenton, N. J.; and 12 feet to head of navigation ($1\frac{1}{4}$ miles above Trenton). Recommendations have been made to Congress, 1933, to provide a 25 foot depth to Trenton and an anchorage at Marcus Hook.

Above Trenton the river is obstructed by shoals and rapids. The main river to Easton, Pennsylvania and the Lehigh River from Mauch Chunk, Pennsylvania have been developed for navigation by lateral canals of small capacity which are now partially abandoned. A 12 foot project for the canalization of the Delaware River from Trenton and the Lehigh River to Sigfried was presented by the Army Engineers. The report thereon was unfavorable primarily because the amount of commerce benefited by an improved waterway would be insufficient to warrant the expense of the improvement. The territory that would be served by an improved waterway is already adequately provided with

8/ House Document 179 - 73rd Congress. 2nd Session. Corps of Engineers Report of Delaware River.

transportation facilities, including railroads and highways. The Lehigh Canal between Easton and Coalport comprises about 37 miles of lateral canal and 10.4 miles of slack water in the river. The Delaware Division Canal extends from Easton to Bristol, Pennsylvania, a distance of about 60 miles. Its use for commercial navigation has been discontinued.

(b) Flood Control:---There is no record of any flood on the Delaware River which attained the magnitude of a disaster or caused great loss of life or property. Flood discharges are small in comparison with those on other streams in the United States having comparable drainage areas.

1. Reservoirs and Detention Basins:---On the Upper Delaware, Lake Wallenpaupack in Pike and Wayne Counties has a storage capacity of 70,000,000 gallons 9/.

A storage Reservoir in Wayne County near Honesdale has a capacity of 282 million gallons. In the Lower Delaware Basin there are 4 storage reservoirs having capacities of over 1,000,000 gallons. These are:

| Owner | Dam | Capacity in Million Gallons |
|---|---|---|
| Boro of Coatesville | Rock Run | 332 |
| Philadelphia Sub. Water Co. | Pickering Creek | 380 |
| " " " " | Crum Creek | 162 |
| " " " " | Springton | 3,500 |

These reservoirs exist primarily for water power and water supply purposes but may be considered as a means of flood control.

9/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania December 19, 1934 - Page 214.

2. Levees:---A levee has been built at Port Jervis to protect the city from floods usually caused by ice jams. Other than this levee there are none of importance in the Basin.

3. Channel Improvements:---Channel obstructions have been removed below Port Jervis principally to prevent the formation of ice jams. The main river channel has been improved from the mouth of the river to Trenton by the United States for navigation.

The State Water and Power Resources Board is authorized by law to establish channel lines and to control by permit the encroachment of new construction thereon. This law has been in effect since 1913.

(c) Municipal, Domestic and Industrial Supplies:---

1. Domestic Supplies:---Computations made on the basis of data contained in the yearbook of the Pennsylvania Department of Health for 1934 (unpublished) indicate that 16 communities were served with chlorinated water. The population served comprised 50,550 persons or approximately 50 per cent of the population (1934) of the Upper Delaware Basin 10/ residing in communities 11/.

There were no filtered supplies listed in this portion of the Basin.

Complete data are not available concerning places having untreated supplies. It is known however, on the basis of the Report of the Pennsylvania Water Supply Commission (1916) and Reports of the Pennsylvania Geological Survey on "Groundwaters in Northeastern Pennsylvania and Groundwaters in Southeastern Pennsylvania", that 4 communities in the Upper Delaware Basin

10/ Statistics for the Middle & Lower Section of the Delaware Basin were included in the Report on the Schuylkill Basin since it was not possible to separate these data from those for Philadelphia.

11/ See Table II. This figure is made up of the population of unincorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-McNally & Company.

have untreated public supplies. The population of these places in 1934 was 3,663.

A tabulation of all cities, boroughs and unincorporated places (having a population of over 500) within townships in the Basin is included in Appendix A. This tabulation lists for each community the status of water supply and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

2. Industrial Supplies:---There is no State Department having jurisdiction over industrial water supplies and complete data concerning them are not available. The Water Resources Inventory Report (1916) listed industrial supplies, but this information is now obsolete.

(d) Irrigation:---The Delaware Valley has an ample, dependable and well distributed rainfall which is sufficient for the general needs of agriculture and extensive irrigation systems are unnecessary 12/.

Delaware water is used in small quantities for the intensive cultivation of special crops. This use of water is relatively unimportant.

(e) Water Power:---While the Delaware River has a large potential water power, little has been developed except, in Pennsylvania, on one of the tributaries, the Wallenpaupack River.

1. Mechanical:---There are no mechanical plants in the Basin developing over 100 horse-power.

2. Hydro-electric:-The Pennsylvania Power and Light Company operates a hydro-electric plant on the Wallenpaupack Creek. The Wallenpaupack Dam creates a head of water of 330 feet. The total installed capacity of the plant is 57,000 horse-power.

There are 2 hydro-electric plants on Broadhead Creek, one located near

12/ House Document 395 - 73rd Congress 2nd Session 1934. Page 70.

its mouth is operated by the Metropolitan Edison Company and has a total installed capacity of 1,250 horse-power with a 25 foot head. The other is located further up the stream and is operated by the Analomink Paper Company. The total installed capacity of this plant is 1,200 horse-power operating under a head of 18 feet.

(f) Drainage:---None of importance.

(g) Recreation and Wild Life:---Counties mainly in the Basin (Bucks, Delaware, Monroe, Pike and Wayne) now contain 10,226 acres of State Game Lands and 65,985 acres of State Forest Lands. In addition there are 9,101 acres of park and recreation land of which 7,000 acres are privately owned, probably largely in golf courses. This amount is considered inadequate and recommendations have been made 13/ for the future acquisition of an additional 10,448 acres of public park and recreation land and 277,423 acres of forest and game lands.

The State Forest Public Camps have special camping facilities including shelters, fireplaces, drinking water, tables, benches and comfort facilities. Promised Land Camp in Pike County is most popular for week-end and holiday outings.

Permanent camp sites may be leased on suitable areas in the State Forests for summer cottages, hunting lodges, etc. These camp sites meet the recreational needs of an ever growing class of citizens.

The Pennsylvania Fish Commission is conducting a program of stream improvement for the smaller unpolluted streams and is restocking them with game fish.

Natural lakes and ponds in the Upper Delaware Basin provide locations for boating and fishing. Many of them are used as summer resorts.

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13/ Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pennsylvania December 1934. Page 172.

(h) Correlated Uses:---A good example of a correlated use of water resources is the Wallenpaupack Lake. This lake, formed by a dam, and primarily used for water power, is also used for recreational purposes, and has some regulating effect on stream flow.

(i) Imported and Exported Water Supplies:---None of importance known.

## V UNDERGROUND WATER 14/

(a) Extent of Areas and Supplies:---Groundwater is generally available throughout the Upper Delaware Basin for domestic and industrial use. Within the coal basins the water level has been lowered by continual pumpage of mine water, and most of the water that remains in reach of wells is unfit for domestic use.

The regions not included in the coal basins have adequate supplies of groundwater available for domestic and industrial use. Most of the drilled wells in these areas obtain their water supplies from sandstones but a few obtain water from conglomerate, shales and limestones. Most of the rock formations contain numerous beds of sandstone that can generally be reached by wells of moderate depth. Shale yields small but generally reliable supplies.

Groundwater is also generally available in the Lower Delaware Basin. The Triassic deposits in this region are the best aquifers with the exception of the Petapsco of the Cretaceous system. Domestic supplies are usually obtainable at depths of less than 300 feet. The unconsolidated sands and gravels of the Coastal Plains are excellent aquifers but in most places they are too thin to be of importance as sources of groundwater.

There are maps available 14/ showing the occurence and distribution of the various geologic formations in the Basin and the location of wells on which data is available indicating depth and description of water-bearing materials.

14/ Includes Basins of Lehigh and Schuylkill. Information from "Groundwater in Southeastern Pennsylvania", Bulletin #W-2 and "Groundwater in Northeastern Pennsylvania", Bulletin #W-4, Pennsylvania Geological Survey, Harrisburg, Pennsylvania.

(b) Character or Quality:---

1. Upper Delaware Basin:---With very few exceptions the chemical character of the groundwater is entirely satisfactory for most purposes. Water from glacial drift or light-colored sandstone generally contains very small amounts of dissolved mineral matter and is usually quite soft. Water from dark-colored shales or sandstone contains more dissolved mineral matter, and in some cases is quite hard. Water from limestone varies from moderately hard to very hard.

2. Lower Delaware Basin:---Of 144 samples of water from springs and wells which were analyzed, only 2 contained more than 1,000 parts total dissolved solids per million parts of water; and 46 contained less than 100 parts per million. The largest amounts of solids were found generally in the waters from the limestones and from the shales and sandstones of the Triassic Age. Many of the waters are hard due to the presence of the bicarbonates of calcium and magnesium. The waters from the quartzites are quite soft.

With very few exceptions the waters from this area that were analyzed do not contain enough mineral matter of any sort to be unsatisfactory for drinking or cooking purposes, but some waters are hard and some contain objectionable amounts of dissolved iron.

(c) Economic Availability:---Groundwater is readily and economically available for domestic and industrial use in the entire Basin except within the coal measures. In the coal measures groundwater is pumped from the mines in large quantities and used for washing coal, but is not suitable for domestic use.

(d) Extent of Use:---The uses of groundwater can be grouped into---(1) private supplies for domestic use; (2) supplies for livestock; (3) sup-

plies for industrial use including railroad supplies; (4) supplies for public waterworks.

1. Lower Delaware Basin:---Most wells in the area are for private supplies and domestic use. A number of wells furnish water at barns, particularly on the large dairy farms. The use of wells for industrial purposes is increasing. Large amounts of ground waters are used in the lower end of Philadelphia for a variety of industries. Groundwater is probably in greater demand for cooling purposes than for any other industrial use. The railroads in this area rely chiefly on surface supplies but have some wells for supplying locomotives. At Oxford the Pennsylvania Railroad has a drilled well which yields large volumes of water. A number of towns in the area use groundwater from springs or wells and in some cases from both.

2. Upper Delaware Basin:---In rural areas dug and drilled wells are used extensively for domestic purposes. The use of dug wells is being discontinued; the ratio of drilled wells to the total number of wells is increasing because in many cases the dug wells are reported to be unreliable during dry seasons and are subject to contamination. A great many small industries such as creameries, ice companies, etc., use drilled wells. Perhaps the largest use of groundwater is in coal washing operations in which a large quantity of mine drainage water is used. A large quantity of groundwater derived from glacial outwash is used for cooling purposes in the generation of electric power.

(c) Prospective Uses:---It appears that groundwater will continue to be used as a source of rural domestic supply and as a supply for small industrial plants. In the anthracite region continued pumping of the mines makes groundwater unavailable for any purpose other than washing

coal or for cooling.

Recent experiments have been conducted in West Chester and Kennett Square, which are the important centers of the mushroom industry, with use of groundwater as a cooling agent. So far results from these experiments have not entirely fulfilled the expectations of the experimenters.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

In reference to pollution the following quotation is taken from the abridged proceedings of the Regional Conference on Problems of the Delaware River. Philadelphia, Pennsylvania, April 3, 1936. Page 13. Remarks by Dr. William Rudolfs.

"The Delaware and many of its tributaries are polluted by the direct discharge of sewage from public and private sewers, cesspools, septic tanks, garbage dumps and by industrial wastes. In New York State the Delaware is polluted by untreated sewage from Port Jervis and smaller places and from about sixty industries, so that the river is definitely polluted below Port Jervis."

"In Pennsylvania there are, above tidewater, twelve communities, with a population of about 280,000 which discharge raw, partially treated, or completely treated sewage into the water, and a number of industrial plants discharge waste. In the tidal Basin the most important offender is Philadelphia which partially treats only small portions of its sewage. In New Jersey, sewage is discharged by Trenton, Camden, Philipsburg and Burlington, which among other places, contribute partially or completely treated sewage. In Delaware, the most important source of pollution is Wilmington, which discharges untreated sewage from more than 100,000 people."

"As to the degree of pollution: by the time the water reaches Tri-State Road, at Port Jervis, the river is definitely polluted. It remains a health hazard for a number of miles, gradually improves until it reaches Easton and Philipsburg, where it is repolluted, but recovers gradually before it reaches Trenton. Below Trenton the intensity is very high, but despite the pollution added by Chester, Wilmington, Pennsgrove, and New

Castle the intensity decreases appreciably from there on because of dilution and self-purification".

Deposits of culm, or waste from coal-mining operations have accumulated in the valleys of the Schuylkill and Lehigh Rivers. Culm is readily moved in time of freshets, which have caused a steady progression of these deposits downstream. It is now being deposited in the navigable waters of the Delaware in such quantities as to be harmful to navigation.

Gross pollution of the Delaware River exists from the vicinity of the Pennsylvania Railroad Delaware Bridge near the Northeast Sewage Treatment Plant down to Chester 15/. Camden and Philadelphia both contribute to this situation but Philadelphia is the worst offender. "Sewage pollution is so great as to render animal life impossible in the river in this vicinity16/"

In 1922, the Department of Health of Pennsylvania and New Jersey inaugurated an inter-state stream conservation agreement. The provisions of the agreement are primarily for safeguarding the water supplies in one state from harmful pollution originating in the other state.

Control of pollution of inter-state streams can best be had by compacts between states but this is not easy to bring about. In the interim, agreements between State Health Departments are reasonably effective.17/

(a) Sewage:---According to a report submitted to the Pennsylvania State Planning Board by the State Department of Health in March 1935, there were in the Basin 19 communities having sewage collection and treatment works.

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15/ Remarks by Dr. W. L. Stevenson at Conference with Mr. Sanborn on Drainage Basin Study, May 28, 1936.

16/ "The Development of Rivers in the United States", House Document 395 - 73rd Congress 2nd Session - Page 72.

17/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934 - Page 229.

Sewage from 3 additional communities was treated at the Chester treatment works. The 1934 population of these 22 communities was 141,363 persons 18/ and comprised about 36 per cent of the Basin's community population 19/ . The above facilities did not necessarily serve the entire population, however.

The same report listed 34 communities having public sewers but no treatment works. These sewers emptied either into streams or into sewers of adjoining communities. They did not necessarily serve the entire population of the places having them. This population however, in 1934 comprised 186,844 persons or about 47 per cent of the community population 19/.

The report indicated that orders to install treatment works as a condition to a sewer permit had been issued by the Department of Health to Marcus Hook, population (1934) - 4,679.

Treatment plants are now under construction at Stroudsburg and East Stroudsburg as a P. W. A. Project (estimated cost $152,500) and at Radnor Township, Delaware County (cost $328,000). These places have a combined population of 24,639 or 6 per cent of the community population.

A tabulation of all cities, boroughs and unincorporated places (having a population of over 500) within townships in the Basin is contained in Appendix B. This tabulation lists for each community the status of sewage disposal and such additional information as is contained in the files of the Pennsylvania State Planning Board.

Philadelphia is not included in these statistics but is included in the Schuylkill Basin Report.

Sewage pollution in the Basin is a major problem only in the vicinity of Philadelphia and Delaware Counties. The city of Philadelphia should be

18/ Estimated by Pennsylvania State Planning Board.
19/ See footnote 3/.

required to install proper intercepting sewers and to give its sewage at least primary treatment.

In Delaware County there are 34 individual though contiguous communities practically all of which are sewered. This sewage is discharged untreated into local streams which flow into the Delaware River. One stream carrying the sewage from 22 outlets enters close to the intake supplying the city of Chester. (See section VII).

(b) Trade Wastes:---Industrial waste agreements made by the Pennsylvania Sanitary Water Board with the tannery and bituminous coal operators in regard to treatment of trade wastes have been abrogated recently. A policy dealing with individual offenders has been followed after the abrogation of the above agreements. An agreement made by the Board in 1921, with the pulp and paper manufacturers is partially in force and those made in 1928, with the operators of by-product coke ovens are still in force.

The Department of Health has in its files a mass of data pertaining to pollution by trade waste. No comprehensive summary of factual data is available, however, and the time allowed for this study does not permit the analysis of the above material to obtain such data.

It is known, however, that waste from industrial plants along the river, particularly in the vicinity of Philadelphia is discharged into the stream. The problem of elimination of pollution from these sources should be studied in connection with the elimination of pollution by sewage.

(c) Oilfield and Mining Wastes:---There are no oilfields located in the Delaware River Basin.

Pollution from mining wastes is chiefly in the form of culm, or fine

coal, and minewater containing sulphuric acid. Along the small streams where the current is rapid, the water is black and culm is carried in suspension and deposited in the larger creeks and rivers; but where the flow is sluggish, culm settles quickly and is carried to the main water courses only during freshets. For this reason streams that at low flow are almost clear may carry large quantities of culm in times of high water and do more local damage to surrounding territory than those which regularly discharge culm into the rivers.

The Delaware River receives mine drainage and culm through both the Lehigh and Schuylkill tributaries. Pollution from mining wastes is more serious on these tributaries than on the main river.

A complete investigation should be made similar to that now being carried on by the Corps of Engineers on the Schuylkill River for the purpose of developing a sane and practical plan for the improvement of stream channels affected by culm and other wastes from anthracite mines. (See Schuylkill River Report.)

(d) <u>Silt and Erosion</u>:---The Reconnaissance Erosion Survey of the State of Pennsylvania made by the Soil Conservation Service in May 1935, the results of which are graphically portrayed on a map on file at the Pennsylvania State Planning Board office, indicates that the upper portions of the Basin are subject to little or no erosion. Small sections in the Basin to the west and south of Stroudsburg are subject to "moderate sheet erosion" and "moderate sheet erosion with occasional gullies". The section of the Basin between the Basins of the Lehigh and Schuylkill Rivers has little or no erosion except in a portion near Doylestown which is subject to "moderate sheet erosion with occasional gullies" and a small section north of Philadelphia subject to "moderate sheet erosion". The extreme southern portion of the Basin is subject to "moderate sheet erosion" along the upper Brandywine Creek merging into "moderate sheet erosion with occasional gullies" as this stream descends to the Delaware River.

The problem of erosion is serious on the red soils of the Triassic formations. The problem would be even more serious but for the fact that 74 per cent of all crops are of the erosion-resistant group. Control calls for more grass, clover, alfalfa and trees on the steeper slopes 20/.

Foul sediment exists along the lower course of the Delaware. This sediment is in the form of culm mixed with silt brought down from the anthracite regions of the Lehigh and Schuylkill Rivers and has been accumulating for many years.

Other than the accumulation of culm no factual information appears to be available on silting in this area. However, the rugged nature of the Delaware watershed above the "Fall line" marking the boundary between the Atlantic Highlands and the Atlantic Coastal Plain, and the well paved stream beds coupled with the general forestation, results in a clear and relatively pure run-off 21/.

(e) Irrigation and Drainage:---Irrigation is used to a very limited extent in the Basin and there are no drainage systems of importance. Pollution from these sources is therefore negligible.

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20/ Development of Rivers of the United States - House Document 395, 73rd Congress 2nd Session, Page 73.

21/ House Document 179, 73rd Congress 2nd Session - Report of Corps of Engineers on Delaware River, Page 39.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:---The following quotation is taken from the Army Engineer's report 22/. "The improvement of the Delaware River between Trenton and the sea, under the existing project, is sufficient to serve all present and reasonably prospective navigation. Improvement of the river for navigation above Trenton is not justified at the present time and it is highly improbable that sufficient traffic will ever develop to justify an expensive project."

It is estimated that the cost of improvements to provide a 10 foot navigable depth to Martins Creek, 7 miles above the mouth of the Lehigh and up the Lehigh to Siegfried, 24 miles above its mouth, suggested by the Army Engineers would be about $62,000,000 including real estate, flowage rights, alteration of bridges, and the extinguishment of existing water rights on the canals. 23/.

The existing projects for navigation improvement are described in section IV - (a).

(b) Flood Control:---Flood control as a single project is uneconomical since damages from floods have not been severe or sufficient to warrant the expense of adequate protection. The probability of floods will be reduced by the creation of storage facilities for water supply and power purposes 22/.

(c) Municipal, Domestic and Industrial Supplies:--- In reference to water resources the Army Engineers "308" report states 24/, "The flow of the Delaware River is not utilized to any considerable degree. In general it

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22/ "Delaware River", House Document #179, 73rd Congress, 2nd Session, Washington, D. C. Page 7.

23/ Ibid Page 14 and "Development of Rivers in United States." Page 68.

24/ Ibid Page 47.

is sufficient for established industries and water supplies dependent upon it. Deficiencies resulting from prolonged low-water flows do not appear to have occurred in the past with greater than a 10-year frequency."

Local dissatisfaction has been expressed with the water at present supplied Philadelphia from nearby intakes on the Delaware and the Schuylkill Rivers, due to the pollution of these streams, and the hardness of the Schuylkill water. It appears that only the headwaters of the Lehigh and the Delaware above Water Gap are reasonably available as upland sources for gravity supply; less distant sources are of inadequate yield. The Upper Delaware is a much more economical source than the headwaters of the Lehigh. 25/

Tentative plans have been made for the supply of water to New York City, Northeastern New Jersey, and Philadelphia. 26/. These plans involve extensive storage of high water flows in the headwater area, the transit of the storage water down the main channel of that river and its diversion from that channel to various points by aqueduct carrying it to the places of use. Developments of this character must be undertaken piece-meal over a long period of time and will require agreement between the conflicting interests of the States involved.

The Army Engineers' recommendations on water supply combined with power projects are discussed in part VII-(e).

At a conference 27/ held to discuss Drainage Basin Study problems, Dr. W. L. Stevenson, Chief Engineer, Pennsylvania State Department of Health,

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25/ Ibid Page 98.

26/ "Development of Rivers of the United States", House Document #395 - 73rd Congress 2nd Session Page 71.

27/ Conference held May 28, 1936 at Pennsylvania Department of Health office, Harrisburg, Pennsylvania, between Dr. W. L. Stevenson and Mr. Sanborn on Drainage Basin Study.

suggested that he would like to criticise adversely the Army Engineer's "308" Report on Water Supply on the Delaware. (He had previously made the same criticism to the Army Engineers).

Between 1925 and 1929 the State Health Department made a survey of portions of the Basin north of the Lehigh River. It is sparsely inhabited, rugged. Streams are in good condition. Dr. Stevenson recommended impounding reservoirs for the upper reaches of the Lehigh which would give a pure water supply from a watershed which could be kept under public control of one State.

In Dr. Stevenson's opinion catchment areas above dams for water supply should be publicly owned and controlled and the dams should be operated only for water supply purposes in order that there might be the largest possible retention to allow self-purification, which would require only chlorination for final purification.

The Army Engineers propose to use an inter-state stream having a large drainage area. Hydro-power means that reservoir elevation rises and falls with stream flow and use. At the head of the proposed pool is Port Jervis which is causing gross pollution. The proposed pool would have a normal flow through time of 86 days but with a full pool during flood flow this would be cut to 10 days, rather a short time for self-purification.

In the Delaware River Case, New York proposed the treatment of sewage precedent to taking water but there still remains the possibility of accidental spills at Port Jervis as well as the possibility of the future location there of an industry producing phenol or other objectionable waste.

On the other hand Dr. Stevenson pointed out the favorable points in the Army Engineer's plan. From the standpoint of money their plan is much more desirable.

1. It has one dam instead of several.
2. It requires the acquisition of a minimum amount of land.
3. It has the economic advantage of multiple use,- water supply, flood control and power.

Dr. Stevenson feels that Philadelphia should limp along with the water supply from the present sources, spending money on filters until it can afford to go to the ultimate source. It should then get a publicly owned source not subject to pollution or development. This is in line with his belief that main streams should, in general, not be used as a source of domestic water supply.

Less distant sources than the Upper Delaware which have been considered as possible sources of supply for Philadelphia are the Neshaminy, Perkiomen and Tohickon Creeks.

Estimates made by the Army Engineers as to the available supply from these sources are:

| | Million Gallons Daily |
|---|---|
| Neshaminy Creek | 170 |
| Perkiomen Creek | 160 |
| Tohickon Creek | 100 |

In reference to the present needs of the Basin, the Pennsylvania Department of Health in a report to the Pennsylvania State Planning Board in March 1935, listed 5 communities in the Delaware River Basin having a population of 2,397 persons (1934 estimated population) now depending on private wells and springs as a source of supply, which it felt should have public water supplies.

The same report listed 7 communities having a population (1934) of 7,240 persons or about 7 per cent of the Basin's community population already equipped with public water supplies but where improvements to the water works are needed.

These communities are listed in the tabulation of Water Supplies in Appendix A.

(d) Irrigation:---Irrigation is not an urgent need in the Basin. The dependable and well distributed rainfall in the Delaware River Sub-Basin obviates the necessity for irrigation projects.

(e) Water Power:---As indicated in section IV - (e) there are only 3 Hydro-Electric Plants in the portion of the Delaware River Basin lying in Pennsylvania. The largest of these plants, that on the Wallenpaupack Creek, has an installed capacity of about 40,000 kilowatts. The present power needs are, for the most part, supplied by steam powers.

The Delaware River has a large potential water power. Studies made by the Army Engineer's 28/ indicate a large number of water power sites on the Delaware and its tributaries. They propose, in a plan for a combined water supply and power development, an aggregate installation of 326,000 kilowatts, designed for use on a 25 per cent load factor. It would develop about 608 million kilowatt hours of primary power annually and 540 million kolowatt hours of secondary power in a year of average run-off. The estimated construction cost is $46,754,000.

The President's Committee on Water Flow 28/ lists certain of these projects arranged in an order of merit of construction as follows:

| Name | Capacity | Cost |
|---|---|---|
| Tocks Island (Penna. and N.J.) | 133,800 K.W. | $21,917,000 |
| Belvidere (Penna. and N.J.) | 54,800 K.W. | 5,820,000 |
| Chestnut Hill (Penna. and N.J.) | 37,800 K.W. | 4,438,000 |
| Cannonville (New York) | 25,800 K.W. | 5,507,000 |
| Cochecton (Penna. and N.Y.) | 6,100 K.W. | 1,135,000 |
| Narrowsburg (Penna. and N.Y.) | 10,600 K.W. | 1,598,000 |
| Barryville (Penna. and N.Y.) | 30,000 K.W. | 3,505,000 |
| Mongaup (Penna. and N.Y.) | 26,000 K.W. | 2,826,000 |
| | | $46,754,000 |

28/ See footnote 26/.

According to the Army Engineer's "308" report, conditions on this watershed are well adapted to a combined development of the water resources for power and water supply. Two combined projects are discussed in the report. Combined project No. 1 meets water supply needs until approximately 1950; combined project No. 2 meets these needs until approximately 1980.

Data and cost estimates of these projects may be found in Tables 26 and 27 of House Document No. 179, 73rd Congress, 2nd Session, Washington, D. C.

The above report recommends, however, that no projects for power development should be undertaken by the United States at the present time.

(f) Drainage:---None of importance known.

(g) Recreation and Wild Life:---The existing public park and recreation lands and forest and game lands in the Basin are considered inadequate. The Pennsylvania Department of Forest and Waters and Game Commission have recommended the acquisition of over 277,000 acres of Forest and Game Land in counties mainly in this Basin. (See section IV - (g) page 23 )

Swimming, boating and fishing are forms of recreation rapidly increasing in popularity. Provision for such facilities should be combined with water developments for other purposes wherever possible and in certain instances development primarily for recreational use is desirable.

The Pennsylvania Department of Forests and Waters in its ten-year estimate of Public Works 29/ include the following projects which are mainly for recreational use such as Boating, Park improvements, Swimming, Athletic fields and Pavilions;

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29/ Ten Year Estimate of Public Works - Pennsylvania State Planning Board. 1935.

| Project | Amount |
| --- | --- |
| Roosevelt State Park | $80,000 |
| Promised Land - State Forest Park | 175,000 |
| Ralph Stover State Park | 55,000 |
| Washington Crossing State Park | 40,000 |
| Peaks Pond - State Forest Park | 60,000 |
| Lake Minisink - State Forest Park | 50,000 |

The State Department of Forests and Waters is conducting a recreational survey to determine the needs for development and possibilities for filling these needs.

In connection with the construction of large reservoirs it is considered desirable by authorities on Wild Life 30/ to build low water dams in the draws of the main reservoir in order to maintain pools for the propagation of fish, water fowl and fur-bearing animals when the large reservoirs are drawn down. Mr. O. M. Diebler, Commissioner, Pennsylvania Fish Commission, recommends a minimum water area of 5 acres for such pools.

(h) Rectification of Existing and Prevention of Future Contamination:--- There is a definite need for the abatement of pollution in the Lower Delaware River particularly in the vicinity from Philadelphia to Chester. Contamination of the Delaware River from sewerage has been increasing to such an extent as to bring about a serious unsanitary condition. Besides its menace to the public health, this river pollution constitutes a handicap to the proper development of the Port of Philadelphia.

Existing sewage disposal plants are entirely inadequate in the lower portion of the Basin. Many of the places where this need exists are specifically indicated in Appendix B. This tabulation lists for each community the status of sewage disposal and such information as is now available from data in the files of the Pennsylvania State Planning Board.

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30/ Suggested by Mr. Seth Gordon, Executive secretary, Pennsylvania Game Commission Conference on Drainage Basin Study with Mr. Weed, July 3, 1936.

The natural contour of the territory comprising Delaware County makes it a distinct unit for the consideration of its sewerage facilities. Most of the population is situated on the lower part of the drainage areas of the streams flowing into the Delaware, yet despite this natural advantage, the sewerage and sewage disposal problems are exceedingly complicated.

A plan for the comprehensive collection and treatment of sewage for this area has been made by an unofficial commission. The plan in its preliminary form suggests the building of intercepting trunk sewers for the principal creeks in the county, leading to sewage treatment plants located at strategic points along or near where these various creeks empty into the Delaware.

A map of the general plan of this project is contained in "The Regional Plan of the Philadelphia Tri-State District" 1932. Page 520.

The Sanitary Water Board of the Pennsylvania Department of Health advocates 31/ comprehensive sewer plans and construction programs and has been successful in attaining this. It feels that there should be a trend toward regional sewage treatment with larger plants and fewer of them, which would lower construction and operating costs. The degree of treatment is and should be controlled by the use of the water below the sewage treatment plant.

The deposits of the coal industry wastes in the Delaware River come from the Lehigh and Schuylkill Rivers. Pollution of this nature is preventable at the source. A survey of the Schuylkill River to determine the extent and location of culm is now in progress.

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31/ Dr. W. L. Stevenson at Preliminary Meeting, Drainage Basin study, Harrisburg, Pennsylvania. May 14, 1936.

In regard to trade waste, Dr. W. L. Stevenson in a paper presented to the Chemical Engineering Congress of the World Power Conference states: 32/ "The increase in different kinds of industrial wastes and in the aggregate volume discharged to streams together with the increasing need to use streams for public purposes has made control of resulting harmful pollution an urgent public problem, the solution of which so far has generally been by abatement through the corrective means of treatment."

"This corrective way should be expanded, by or under the auspices of central governments, by research towards lessening the pollution potentialities of industrial wastes through changed processes of manufacture, re-use of usable wastes and recovery of marketable by-products as preventive measures thereby minimizing corrective works."

"This is too big a task for single units of government or of industry to successfully undertake. It requires an impartial, competent centralized authority, working in close cooperation with State authorities and with industries".

Included in an appendix to the paper quoted are descriptions of known processes for such treatment by recognized authorities.

After practical means for treating wastes are developed it will be necessary to insure their actual use in preventing pollution.

In Pennsylvania the Sanitary Water Board has long campaigned for the abatement of pollution and lacking supporting legislation it has worked largely on a cooperative basis with considerable success.

The Lonergan Water Pollution Bill (S-3958 - 74th Congress, 2nd Session) which failed to pass in the last session of Congress, proposed Federal legislation placing control of pollution of navigable streams and

32/ "The Treatment and Disposal of Industrial Wastes", by Dr. W. L. Stevenson, Harrisburg, Pennsylvania, December 15, 1935. Page 18.

their tributaries in the hands of the National Resources Committee.

This Bill was favored by the Pennsylvania Fish and Game Commission and by Pennsylvania Deputy Attorney General, Grover Ladner, who has been active in its formulation and support.

# LEHIGH RIVER SUB-BASIN

I GENERAL DESCRIPTION OF THE LEHIGH RIVER BASIN 33/

(a) Length:---Maximum, approximately 56 miles.

(b) Breadth:---Maximum, approximately 36 miles.

(c) Area:---1,373.1 square miles.

(d) Physiography:-

Topography:---The Basin above Lehigh Gap lies within the Allegheny Mountain region, containing broken and somewhat parallel ridges with narrow valleys between them. The ridges and steep slopes are well wooded. Below Blue Mountain at Lehigh Gap the Basin lies in the Piedmont Plateau, containing broad, rolling agricultural country.

Geology:---The mountainous regions are of shale and sandstone formations and contain rich deposits of anthracite coal in Luzerne, Carbon and Schuylkill counties. In the Piedmont Plateau the stream first enters a slate formation, where are located extensive slate quarries; thence a limestone formation is traversed, which is especially adapted to the manufacture of cement. The terminal moraine traverses the Basin in an easterly-westerly direction through Luzerne, Carbon and Monroe counties. Above this moraine are located numerous lakes, ponds and swamps.

Channel:---The stream flows between high and rock banks, es-

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33/ Source:- Paragraphs (a) and (b) scaled from Stream Map of Pa.- 6 miles- 1 inch. Paragraphs (c) and (d) Water Resources Inventory Report, Part III - Gazetteer of Streams. Pennsylvania Water Supply Commission, Harrisburg, Pa. 1916. Paragraph (f) Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pa. Dec. 1934. P.71.

pecially in upper course. The channel contains numerous rapids and waterfalls. The bed is rock throughout most of its length and in places is covered by a thin layer of drift. In its lower course, behind the navigation dams, extensive silting has taken place.

Profile:----- Rate of fall per mile: from Slatington, elevation 338, to Allentown, elevation 225, 17.5 miles, 6.5 feet; thence to its mouth nearly 16.5 miles, 4.1 feet.

(e) Cover:--- See Land Use Map (Fig.II) and Table V which shows proportions of various types of cover in the Basin.

(f) Climate:---The mean annual precipitation varies from 43 inches at Bethlehem to 48 inches at Mount Pocono, the average for the whole watershed is 45 inches. The average snowfall is about 46 inches. Temperatures of 100° or higher are seldom recorded but relative high humidity makes the temperature oppressive. The summer mean is about 70° and the winter mean about 27° . 34/ Prevailing winds are from northwest in winter and southwest in summer and the wind movement is generally light or moderate.

(g) General Relation to Adjoining Basins:---- The Lehigh River Basin is bounded on the northwest by the Susquehanna River Basin, on the southwest by the Schuylkill River Basin and on the east by the main Delaware River Basin.

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34/ Averages of northern and southern portion of Delaware Basin are taken for Lehigh Basin.

TABLE V.

APPROXIMATE FOREST AND CLEARED LAND CLASSIFICATION.

LEHIGH DRAINAGE SUB-BASIN

| CLASSIFICATION | AREA | PERCENTAGE |
|---|---|---|
| Forested | 379,000 Acres | 43% |
| Cleared | | |
| Non-Farm | 44,000 Acres | 5% |
| Farm | 340,000 Acres | 39% |
| Urban, R.R., Highways, etc. | 116,000 Acres | 13% |
| Total Land * | 879,000 Acres | 100% |

* Excludes area of water in the largest rivers. U. S. Census "Land Area."

Note: Prepared from "County Area" data in the files of the Department of Forests and Waters, assuming parts of counties in watershed have same proportion of each land class as the entire county.

## II HUMAN OCCUPANCY

In 1930, the Lehigh Basin within Pennsylvania had a population of 436,165 persons.35/ This comprised over 4 per cent of the population of Pennsylvania and 0.4 per cent of the population of the United States. The average density of population was 317 per square mile. Figure III shows the distribution of population in Drainage Basins for 1930.

(a) Cities and Towns:--- Information regarding the number, classification by population, size and rate of development, and general character of cities and towns of the Basin is given in tables VI and VII.

(b) Rural Development:---

1. Agricultural:---36/ The northwestern portion of the Basin lies in the anthracite coal region, while the northeastern portion is in the Pocono Resort Area. This northern portion is largely forested as shown by the Land Use Map (Fig.II). The southern portion lies in the Lehigh diversified farming region and contains the Lehigh County Potato Region.

Study of the Land Use Map (Fig.II) will indicate that the lower portion of the Basin south of Carbon County is largely above average and superior farm land, with small scattered areas of woodland.

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35/ Based on U. S. Census 1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each Basin is estimated as proportional to area. Towns on the line are placed in one Basin or the other.

36/ Preliminary Report Pennsylvania State Planning Board - Harrisburg, Pennsylvania, December 1934, Page 106.

TABLE VI

POPULATION CLASSIFICATION OF LEHIGH BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934 ** Population | ESTIMATED 1934 ** Per Cent of Total Basin | ESTIMATED 1934 ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CITIES & BOROS | | | | | | | | | | | | | |
| 100,000 or Over | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 50,000 to 100,000 | 2 | 59,415 | 23.2 | 150,455 | 34.5 | 39.0 | 151,244 | 35.1 | 39.5 | + 91,040 | + 153.2 | + 789 | + .5 |
| 25,000 to 50,000 | 2 | 39,470 | 16.4 | 71,233 | 16.3 | 18.5 | 68,424 | 15.8 | 17.9 | + 31,763 | + 80.5 | - 2,809 | - 4.1 |
| 10,000 to 25,000 | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 5,000 to 10,000 | 9 | 19,228 | 7.6 | 67,909 | 15.6 | 17.6 | 67,085 | 15.6 | 17.5 | + 48,681 | +253.2 | - 824 | - 1.2 |
| 2,500 to 5,000 | 9 | 24,231 | 9.7 | 32,859 | 7.5 | 8.5 | 32,726 | 7.6 | 8.5 | + 8,628 | + 35.6 | - 133 | - .4 |
| Under 2,500 | 15 | 7,848 | 3.1 | 15,497 | 3.6 | 4.0 | 15,685 | 3.6 | 4.1 | + 7,649 | + 97.5 | + 188 | + 1.2 |
| TOTAL CITIES & BOROS | 37 | 150,192 | 60.0 | 337,953 | 77.5 | 87.6 | 335,164 | 77.7 | 87.5 | + 187,761 | +125.0 | - 2,789 | - .8 |
| TOWNSHIPS | - | 100,234 | 40.0 | 98,212 | 22.5 | -- | 95,953 | 22.3 | -- | - 2,022 | - 2.1 | - 2,259 | - 2.4 |
| Unincorporated Villages | - | -- | -- | * 47,754 | 10.9 | 12.4 | 47,754 | 11.1 | 12.5 | -- | -- | -- | -- |
| Scattered | - | -- | -- | 50,458 | 11.6 | -- | 48,199 | 11.2 | -- | -- | -- | - 2,259 | - 4.7 |
| TOTAL Population Residing in Communities | - | -- | -- | 385,707 | 88.4 | 100.0 | 382,918 | 88.8 | 100.0 | -- | -- | - 2,789 | - .7 |
| GRAND TOTAL LEHIGH SUB-BASIN | - | 250,426 | 100.0 | 436,165 | 100.0 | -- | 431,117 | 100.0 | -- | + 185,739 | + 74.2 | - 3,048 | - 1.2 |

* 1934 Estimate by Rand McNally & Company
** Estimate by Pennsylvania State Planning Board

(1900 Per Cent of Pennsylvania Population in Lehigh Basin 4.0-ofU.S..3)
(1930 Per Cent of Pennsylvania Population in Lehigh Basin 4.5-ofU.S..4)

TABLE VII

CLASSIFICATION OF CITIES AND BOROUGHS IN LEHIGH BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Per Cent Increase 1900 to 1930 | Predominant * type of Industry |
|---|---|---|---|---|
| 50,000 to 100,000 (2) | | 150,455 | +153.2 | |
| Allentown | Lehigh | 92,563 | +161.4 | A & M |
| Bethlehem | Northampton | 57,892 | +141.2 | M |
| 25,000 to 50,000 (2) | | 71,233 | + 80.5 | |
| Hazleton | Luzerne | 36,765 | +158.4 | (M) |
| Easton | Northampton | 34,468 | + 36.6 | T & M |
| 5,000 to 10,000 (9) | | 67,909 | +253.2 | |
| Lansford | Carbon | 9,632 | + 97.1 | M |
| Lehighton | Carbon | 6,490 | + 40.2 | T & M |
| Palmerton | Carbon | 7,678 | -- | M |
| Summit Hill | Carbon | 5,567 | + 86.4 | M |
| Emaus | Lehigh | 6,419 | +337.2 | M |
| Freeland | Luzerne | 7,098 | + 35.1 | M |
| Northampton | Northampton | 9,839 | -- | M |
| Wilson | Northampton | 8,265 | -- | M |
| Coaldale | Schuylkill | 6,921 | -- | M |
| 2,500 to 5,000 (9) | | 32,859 | + 35.6 | |
| East Mauch Chunk | Carbon | 3,739 | + 8.1 | M |
| Mauch Chunk | Carbon | 3,206 | - 20.4 | M |
| Weatherly | Carbon | 2,531 | + 2.4 | M |
| Catasauqua | Lehigh | 4,851 | + 22.4 | M |
| Coplay | Lehigh | 3,279 | +107.4 | M |
| Fountain Hill | Lehigh | 4,568 | +276.2 | M |
| Slatington | Lehigh | 4,134 | + 9.6 | (M) |
| Hellertown | Northampton | 3,851 | +416.9 | M |
| North Catasauqua | Northampton | 2,700 | -- | M |
| Total, Cities & Boros under 2,500 (15) | | 15,497 | + 97.5 | |
| Grand Total (37) | | 337,953 | +125.0 | |

* A - Agriculture T - Transportation M - Manufacturing (M) - Mining.

Table VIII gives statistics pertaining to counties mainly within the Basin (Carbon, Lehigh and Northampton) and shows trends in Agricultural development. The trend has been downward from 1900 to 1930 but shows a decided reversal for the past 5 years. The farm population for the area involved was 31,057 in 1930. This increased to 34,536 in 1935.

TABLE VIII

Number of Farms and the Amount

of Land in Farms for Counties

Located Mainly in the Lehigh Basin

| Year | No. of Farms | Land in Farms (Acres) | Per Cent of Total Area | Per Cent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 7,879 | 497,996 | 69.4 | 2.6 |
| 1910 | 7,796 | 480,611 | 66.9 | 2.6 |
| 1920 | 7,191 | 450,183 | 62.7 | 2.5 |
| 1925 | 6,718 | 401,322 | 55.9 | 2.5 |
| 1930 | 5,768 | 393,664 | 54.8 | 2.6 |
| 1935 | 6,560 | 390,116 | 54.3 | 2.5 |

Source:- Census of Agriculture -- U. S. Department of Commerce.

2. Industrial (decentralized):---The major decentralized industries of the Lehigh Basin include the production of anthracite coal, slate, cement, crushed stone, sand and gravel.

3. Mining (including petroleum):---Carbon County in the Anthracite Coal Mining Area lies almost wholly in the Lehigh Basin. While the eastern ends of Luzerne and Schuylkill Counties also lie in the Basin it was not feasible to split up the mining statistics. Carbon county contained in 1933 37/ 11 mining operations with 4048 employees. These operations produced 1,753,110 tons of anthracite coal or about 4 per cent of the total production sold in the State in that year.

37/ Report of Pennsylvania Department of Mines 1933.

As has been indicated the quarrying of slate, limestone and traprock constitutes a major industry in the Basin.

4. Lumbering:---The lumbering industry which reached its peak in Pennsylvania in 1900 has been declining since that time and is at present relatively unimportant in the State although it remains a potential industry for the future. As indicated by the Land Use Map (Fig. II) there is considerable forest land in the northern part of the Basin which under "sustained yield" development might play a part in the rejuvenation of lumbering.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies under Sections (a) and (b).

1. Cities and Towns:---Study of Table VI indicates the rapid growth of cities and boros in the Basin which more than doubled in population between 1900 and 1930 but which as a group showed a slight loss between 1930 and 1934. The tendency to draw together to form communities is indicated by the fact that in 1900 about 60% of the Basin population was listed in boros and cities whereas in 1930 these places included over three-quarters of the population. During the past five years the statistics indicate a limited "back to the land" movement. This is thought to be a temporary condition accountable to the depression causing a temporary interruption in the longer trend. Even though the "decentralization of industry" movement may continue to develop, it is believed that people will continue to dwell in communities where the benefits of group service and culture are more amenable to a highly developed civilization.

2. Agriculture:---Trends in agricultural development shown in Table

VIII indicate as would be expected the reverse of those showing development of cities and towns, - a dropping off in number of farms, and area of farm land. This is in line with improved agricultural production methods and the consequent decrease in needed acreage and manpower despite increasing production. The reversal in trend during the past 5 years is believed to be temporary and is probably accounted for by the fact that much land formerly abandoned as incapable of producing an adequate return is now occupied by persons forced to leave the cities by depressed industrial conditions.

As may be seen on the Reconnaissance Land Utilization Map (Fig. II) there are areas of "below average" farm land in the upper part of the Lehigh Basin.

3. Industry:---Pennsylvania produces 93 per cent of the anthracite coal produced in the United States and while this industry is faced with many operating difficulties at the present time, including competition from other fuels such as oil and gas, high production and distribution costs, and periodic labor difficulties, it is expected that the industry will continue to function until the minable coal is exhausted about 100 years hence. 38/ There has been a declining production trend traceable largely to the factors mentioned. Two-thirds of the anthracite is used for domestic heating purposes and competition in this field from oil and gas has been heavy. With the expected depletion of these resources,however, within the next 30 or 40 years it is probable that this source of competition will decline.

38/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pa., December 1934, Page 241.

During recent years there has been a tendency for manufacturing industries to locate in this region to take advantage of the good location and transportation facilities and it seems probable that this trend will continue.

Three-fourths of the Portland cement produced in Pennsylvania is made in the Lehigh cement district where ideal "cement rock" is found. This industry has been steadily increasing except for the depression years although not so rapidly as in other parts of the country. It is expected to continue to flourish in the future.39/

The Allentown, Bethlehem, Easton metropolitan area at the lower end of the Basin contains over half the population of the Basin and constitutes a prosperous and diversified manufacturing and industrial center. Advantageously located in a region rich in natural resources and good agricultural land, close to the largest metropolitan areas of the country, this section is expected to continue to develop in the future.

(d) Transportation Facilities:---

1. Waterways:--- See Section IV-a.

2. Highways:--- Most of the Lehigh watershed is traversed by a network of concrete or other improved roads, which have lent themselves to well coordinated systems of bus transportation. The principal exceptions are in the Pocono Mountains and in the steep and broken areas between Mauch Chunk and White Haven, and also further upstream, which retain something of their primitive character and are still difficult of access.

3. Railroads:--- The Principal railroads which operate lines

39/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pa., December 1934, Page 263.

in the Basin are:- Pennsylvania Railroad; Philadelphia and Reading Railroad; Lehigh Valley Railroad; Delaware and Lackawanna Railroad, and Central Railroad of New Jersey.

In addition to the above several other smaller lines operate in the Basin. These railroads afford a transportation system which connects all the population centers.

4. Airports:--- The United States Department of Commerce Airway Bulletin #2 lists 6 commercial or municipal airports within the drainage area.

(a) LEHIGH RIVER                                        Main Stream

1. Source:---In Sterling Township, southwestern Wayne County.

2. Course:---Southwesterly to White Haven, being boundary of Lackawanna and Luzerne counties to northwest and of Monroe and Carbon counties to southeast; thence southeasterly, through Carbon and between Northampton and Lehigh counties, to Catasauqua; thence southeasterly into Lehigh County to Allentown; thence northeasterly into Northampton County to Delaware River.

3. Length:---One hundred miles along stream.

4. Drainage Area:---1,373.1 square miles. See part I-d for description.

5. Discharge:---Gaging station at Bethlehem, Pennsylvania.

| | | |
|---|---|---|
| Drainage Area above station - 1280 square miles. | | |
| Mean Annual Discharge (1902-05;1909-34) | 1.68 | c. s. m. |
| Minimum Discharge (Oct. 15, 1910) | 0.125 | c. s. m. |
| Maximum Discharge (Feb. 28, 1902) | 71.8 | c. s. m. |

(b) TOBYHANNA CREEK                                        Tributary to Lehigh River

1. Source:---In Coolbaugh Township, Northern Monroe County.

2. Course:---Southwesterly to Carbon-Monroe county boundary to Lehigh River.

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40/ Source for all streams except discharge data - Water Resources Inventory Report, Part III, Gazetteer of Streams. Pennsylvania Water Supply Commission - Harrisburg, Pa. 1916. Discharge data:- Pennsylvania Department of Forest & Waters and U.S. Geological Survey.- Harrisburg, Pennsylvania.

3. Length:---Twenty-three miles along stream.

4. Drainage Area:---Contains 139.1 square miles of broken, mountainous country, containing lakes and swamps of glacial origin; Basin traversed by terminal moraine. The channel is sinuous through sandstone formation and glacial drift.

5. Discharge:---No record.

(c) BLACK CREEK — Tributary to Lehigh River.

1. Source:---Formed by junction of Hazle and Beaver Creeks, 1.5 miles northwest of Weatherly, western Carbon County: Elevation 1270.

2. Course:---Easterly to Lehigh River.

3. Length:---Six and one half miles along stream.

4. Drainage Area:---Contains 62.6 square miles in western Carbon, southern Luzerne and northeastern Schuylkill counties of broken, mountainous country; narrow valley flanked with steep hills. The channel is sinuous, through shale and sandstone formation containing deposits of anthracite at headwaters.

5. Discharge:---No record.

(d) POHOPOCO CREEK (BIG CREEK) — Tributary to Lehigh River.

1. Source:---In Chestnut Hill Township, southwestern Monroe County.

2. Course:---Southwesterly into Carbon County to Lehigh River.

3. Length:--- Twenty-three miles along stream.

4. Drainage Area:--- Contains 105.5 square miles of broad agricultural valley flanked with steep mountain spurs and ridges lying in southwestern Monroe and southeastern Carbon counties.

5. Discharge:--- No record.

(e) LITTLE LEHIGH CREEK — Tributary to Lehigh River.

1. Source:---In Topton Mountain, Longswamp Township, Berks County; Elevation 830.

2. Course:--- Northeasterly into Lehigh County to Lehigh River.

3. Length:--- Twenty-four miles along stream.

4. Drainage Area:--- Contains 187.6 square miles in northeastern Berks and central Lehigh counties. The Basin is rolling agricultural country, bounded by hilly country to southeast. The channel is tortuous through extensive limestone formation containing deposits of iron ore; slate formation in Upper Basin of Jordan Creek. Rate of fall per mile: from source to elevation 600, 1 mile,230 feet; thence to elevation 400, 3.5 miles, 57.1 feet; thence to mouth 19.5 miles,9.0 feet.

5. Discharge:--- No record.

(f) JORDAN CREEK — Tributary to Little Lehigh Creek.

1. Source:--- On southern slope of Blue Mountain, Heidelberg Township,Lehigh County; elevation 740.

2. <u>Course</u>:--- Southeasterly to Little Lehigh Creek.

3. <u>Length</u>:--- Thirty-two miles along stream.

4. <u>Drainage Area</u>:--- Contains 81 square miles in central Lehigh County of broken hilly country in Upper Basin, with narrow, steep-sided valley from Jordan to Kernsville; thence to mouth country is of a rolling nature with broad main valley. The channel is tortuous through slate in Upper Basin and limestone in Lower Basin.

<u>Profile</u>:--- Rate of fall per mile: from source to elevation 600, 3 miles, 46.7 feet; thence to elevation 400, 11.5 miles, 17.[illegible] feet; thence to mouth 17.5 miles, 9.8 feet.

5. <u>Discharge</u>:--- No record.

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENTS

(a) Navigation:--- The river has been improved for navigation from Easton to Mauch Chunk, a distance of 47 miles, by a private corporation, the Lehigh Coal & Navigation Company, by locks, dams and a canal. This canal is now maintained in operating condition between Easton and Parryville. A lateral canal operated for many years by the same company extends from Easton to Bristol, Pennsylvania. These works afford a depth of 6 feet with locks 100 feet by 22 feet and accomodate boats of 120 tons capacity. As commerce is small and local in character the facilities appear to be adequate for the present traffic but large tonnage of commodities such as Portland cement, slag, steel and rock products available has created local interest in the possibilities of a modern navigation project on the Delaware River from Trenton to Easton and thence to Martins Creek with a branch up the Lehigh River to Siegfried. (24 miles above the mouth.) 41/

(b) Flood Control:--- The Lehigh River is subject to severe floods which have caused heavy damage. The total estimated damage from the flood of February 1902 was $3,100,000.42/ Existing provisions for control appear to be inadequate.

1. Reservoirs and Detention Basins.

The Reservoirs in the Basin are as follows: 43/

| Name of Owner | Name of Dam | Capacity in Million Gals. |
|---|---|---|
| Hazleton Water Company | Dreck Creek | 192 |
| Panther Valley Water Company | Greenwood | 370 |
| Panther Valley Water Company | Hauto | 1,385 |
| Clear Spring Water Company | Spring Creek | 100 |

41/ House Document #245-72nd Congress, 1st Session -Corps of Engineers report on Lehigh River.
42/ Ibid - Page 27.
43/ Preliminary Report Pennsylvania State Planning Board - 1934.

These reservoirs are primarily for domestic and industrial water supply purposes but serve indirectly as a measure for flood control.

2. Levees:---None of importance in Basin.

3. Channel Improvements:---None of importance in Basin.

In 1913 the Legislature enacted a Dam and Encroachment Act which makes it unlawful for anyone to construct any "water obstructions" without a State permit.

(c) Municipal, Domestic and Industrial Supplies:---Municipal and domestic requirements of the population of the valley amount to about 45,000,000 gallons of water daily, while industrial demands in normal times amount to about 210,000,000 gallons daily -- a total of nearly 255,000,000 gallons or 395 second-feet. Most of this is returned to the channel, but it is estimated that the total depletion may amount to 30,000,000 gallons daily or 46 second-feet.

The local municipal requirements for many years could probably be supplied by the storage of water from small tributaries, as 100,000,000 gallons daily could be supplied from 100 square miles or less than 8% of the watershed. However, the growing demand for pure upland water at suitable elevations and within economic ranges for gravity flow lends importance to the upper Lehigh watershed as a possible source for supply to adjacent metropolitan districts. See section VII-c. 44/

The yearbook of the Pennsylvania Department of Health for 1934 (un-

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44/ Lehigh River House Document 245, 72nd Congress 1st Session - page 6.

published) tabulates information on public waterworks in Pennsylvania as of May 31st, 1934 for treated supplies.

Using this report as a basis it appears that 349,050 persons or approximately 91% of the population (1934) of the Lehigh Basin residing in communities 45/ were served with treated water, either filtered, chlorinated or both.

Complete data is not available concerning places having untreated supplies. It is known however, on the basis of The Water Resources Inventory Report (1916) and the Pennsylvania Geological Survey report on "Ground water in Northeastern Pennsylvania" that 4 communities are served untreated water from public supplies. The 1934 population of these places was 7,507 persons or 2 percent of the Basin's community population. 45/

Appendix A is a tabulation of all cities, boroughs and unincorporated communities (500 population or over) within townships. This lists for each community the status of water supplies.

1. Filtered Supplies:---The Department of Health Report lists 20 communities in the Basin served by public water filtration plants. The population served comprises 96,000 persons or about 25% of the population residing in communities 45/in the Basin. Many of these supplies are chlorinated as well as filtered.

2. Chlorinated Supplies:---The same report lists 26 communities served by public water supplies without filters but equipped with chlorination plants.

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45/ See Table VI. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand McNally and Company.

These serve 253,050 persons or about 66% of the population residing in communities in the Basin.

3. <u>Industrial Supplies</u>:--- There is no State Department having jurisdiction over industrial water supplies and no complete data concerning them are available. The Water Resources Inventory Report (1916) listed industrial supplies, but this information is now obsolete.

(d) <u>Irrigation</u>:--- Aside from the hydrant water and other meagre quantities used by the individual homes for truck gardens, irrigation has not been practiced on the Lehigh watershed, and there is apparently no immediate prospect of its being introduced. The rainfall is generally dependable and well distributed, meeting the needs of growing crops.

(e) <u>Water Power</u>:

1. <u>Mechanical</u>:--- None of importance.

2. <u>Hydro-electric</u>:--- Present power development on the Lehigh River comprises 19 small plants with a total capacity of 2,585 H.P. in intermittent use, all dependent on the flow in the Lehigh Canal and, with few exceptions, confined to furnishing power for individual enterprises. The most important plant is the one operated by the Metropolitan Edison Company at Easton with a total capacity of 1,052 H.P. 46/

Because of the established trunk line railroads on both banks of the Lehigh River from Easton to White Haven, economic development of the theoretical power available by the construction of a series of dams is impracticable. 46/ Furthermore, any development of hydro-electric power

46/ Lehigh River Document 245, 72nd Congress, 1st Session, Page 19.

in this region is limited by the competition of steam power that can be developed from the large available supply of anthracite coal.

Development of a considerable amount of hydro-electric power would be economically feasible only in connection with additional water supply projects for Philadelphia or other large communities. Incidental flood protection would be provided by such development and some expenditure for such protection would seem justifiable. 46/

(f) Drainage:--- None of importance known.

(g) Recreation and Wild Life:--- Existing park and recreation lands, State Forest lands and State owned game lands are entirely inadequate. There are only 3,282 acres of park and recreation land in the counties mainly in the Basin (Carbon, Lehigh and Northampton). Of this amount 2,500 acres are privately owned.

In the 3 counties mentioned above only Carbon County contains State Forest lands and State Game lands. There are 606 acres of State Forest Lands and 1,949 acres of State Game lands in this county.

Recommendations have been made 47/ for the future acquisition of an additional 136,698 acres of Government Forest and Game Lands and 2,465 acres of State Park and Recreation Lands.

The Pennsylvania Fish Commission is conducting a program of stream improvement for the smaller unpolluted streams not subject to excessive floods, and is restocking them with game fish.

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46/ Lehigh River Document 245, 72nd Congress, 1st Session, Page 19.
47/ Preliminary Report of the Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934. Page 172.

(h) Correlated Uses:---None of importance known.

(i) Imported and Exported Water Supplies:---None of importance known.

## V UNDERGROUND WATERS

See report on Delaware River Basin, Page 25.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

See general discussion of this subject in Report on Delaware River Basin, page 29.

(a) Sewage:---A report submitted to the Pennsylvania State Planning Board by the State Department of Health in March 1935 lists 5 communities having sewage collection and treatment works. These plants did not necessarily serve the entire population; however, the 1934 population of these communities was 201,156 persons 48/ and comprised about 53 per cent of the Basin's community population. 49/

The same report listed 12 communities with population (1934) of 89,618 persons 48/ or about 23 per cent of the community population 49/ having public sewers which emptied into streams or into sewers of adjoining communities some of which received treatment. Orders have been issued to one of these communities, Lehighton Boro, having a population (1934) of 6,641 persons, by the State Department of Health in connection with a permit granted, to install sewage treatment works. It should be noted that the above mentioned facilities did not necessarily serve the entire population listed.

Sewers are now under construction as P.W.A. project in Beaver Meadows, Carbon County at an estimated cost of $46,000.00.

Appendix B is a tabulation of all cities, boros and unincorporated communities (over 500 population) in townships within the Basin. This lists the status of sewage disposal for each place.

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48/ Estimated by Pennsylvania State Planning Board.
49/ See Footnote 45/ page 64.

(b) Trade Wastes:---See general discussion in Delaware, Schuylkill Reports.

(c) Oilfield and Mining Wastes:---There are no oilfields within the Lehigh River Basin.

The Lehigh River receives culm and mine water from several of its tributaries between White Haven and Mauch Chunk. Above Mauch Chunk the channel of the river is narrow and the swift current carries mine waste into the pools formed by the Lehigh Coal and Navigation Company's dams at Mauch Chunk, Parryville and Lehigh Gap. Below Treichlers the silt gradually settles, resulting in clear water at Allentown during ordinary stages of the river but in times of flood stages large quantities of culm and silt are carried into the Delaware River. 50/

Because of this influx of mine drainage from the anthracite districts, the water becomes acid in character below Mauch Chunk, especially during seasons of low flow. Further down stream this acidity is largely neutralized by the inflow of alkaline waters from tributaries draining the downstream district southeast of the Kittatinny Ridge of the Blue Mountains, but the presence of both the acid and the alkaline elements increases the hardness of the water. 51/

(d) Silt and Erosion:---There is so little evidence of erosion in the Upper Lehigh watershed as to justify the estimate that not more than 2 per cent of the capacity of projected reservoirs for this region would be

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50/ Water Resource Inventory Report - Part X - Page 51.
51/ House Document 245, 72nd Congress 1st Session - Page 30.

filled with sediment in a decade, or 20 per cent in a century.52/

Below Mauch Chunk the Basin is subject to "moderate sheet erosion" and in scattered regions to "moderate sheet erosion with occasional gullies."53/

(e) Irrigation and Drainage:--- Irrigation is not practiced in the Lehigh watershed and there are no existing drainage projects, hence pollution from these sources is negligible or non-existent.

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52/ House Document 245, 72nd Congress 1st Session - Page 30
53/ Reconnaissance Erosion Survey Map of State of Pennsylvania. U.S. Geological Survey, May 1935.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:---The large tonnage of commodities that originate in and near the Lehigh Valley would seem to indicate some need for improvement of existing navigation facilities on the Lehigh River. Inasmuch as any proposed project would be practically useless without connections along the Delaware River channel, and the Lehigh branch would be only a minor part of a modern project, consideration of this project is included in the Delaware River report. However, the physical obstructions in the form of bridges may serve as an indication of the initial expense and difficulties to be encountered by such an enterprise. According to conservative estimates 54/ the cost of bridge and grade alterations alone would exceed $5,000,000 as a preliminary expenditure for a navigation project. The Army Engineers recommend that no Federal expenditures be made at this time for such development.

(b) Flood Control:---This is the major need of the Basin. The Lehigh Valley is subject to severe floods which in past years have caused serious damage. The Pennsylvania Department of Forests and Waters lists the following municipalities in the Basin having incipient or actual flood problems:

| Serious Damage | Minor Damage |
|---|---|
| Allentown | Palmerton |
| Bethlehem | Northampton |
| Easton | Freemansburg |
| Lehighton | Weissport |
| Mauch Chunk | Shimerville |
| Catasaqua | |

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54/ "Lehigh River, Pennsylvania", House Document #245, 72nd Congress, 1st Session, Washington, D. C., page 19.

No adequate protection from floods, by means of artificial features, exists in any municipalities within the Basin. A retaining wall is now under construction as a P. W. A. Project at Allentown which will, when completed, afford protection from floods to the water supply system of that city.

It appears that the most favorable method of flood control involves the construction of storage reservoirs. On this subject the Army Engineers in their report state, 55/ "The possibilities for storage on the numerous small tributaries have been investigated with varying degrees of thoroughness, and there are some attractive sites for local development. However, such storage would be so meagre, with both the original construction and the continuous maintenance running into prohibitive costs when measured by the actual benefit to be derived therefrom, as to discourage further investigation from the standpoint of flood control. Apparently the only feasible way in which this desired regulation would be accomplished is in combination with municipal or high-grade industrial water-supply projects and power developments. A number of the most favorable sites have been partially developed, mainly for either water supply or recreational purposes."

In the same report it is estimated that the capital sum of $2,460,000 could properly be expended to secure protection from future flood damage, but this sum is entirely inadequate for control structures. A considerable degree of protection would be afforded by power projects discussed in the report, if constructed.

Some control may be achieved by stream channel improvements and by

55/ "Lehigh River, Pennsylvania", House Document #245, 72nd Congress, 1st Session, Washington, D. C., page 28.

the construction of levees and embankments. Protection might best be secured, not by any one single method, but by a combination of several methods. 56/

Authorized programs of the Works Progress Administration provide a total of $80,893 for 6 projects for flood control. Among these is a survey sponsored by the Pennsylvania Water & Power Resources Board to determine methods of local flood control along the Lehigh River.

(c) Municipal, Domestic and Industrial Supplies:---There is a rapidly growing demand on the part of the public for the use of relatively clean water as a source of supply rather than the serving of purified polluted raw water. Since a large proportion of the Basin's community population is served with artificially purified water from polluted sources this demand lends increasing importance to the Upper Lehigh Watershed.

The water of the Lehigh River is soft in the upper part of its course. Because of the drainage from the anthracite districts the river becomes acid in character below Mauch Chunk. Further downstream this acidity is neutralized by the inflow of alkaline waters from tributaries draining the limestone district. It appears that the best location as a source of water supply for the metropolitan districts is in the neighborhood above Mauch Chunk. 57/

There is a reasonable possibility of diverting the regulated flows

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56/ Preliminary Report State Planning Board - Page 197.
57/ House Document 245 - Lehigh River - 72nd Congress, 1st Session.

from a projected power plant on the Upper Lehigh River without allowing it to commingle with polluted water of the lower valley. (see part VII-e). A gravity conduit from the neighborhood above Mauch Chunk would adequately serve the principal communities of the lower valley, or contribute to the Philadelphia metropolitan district.

So far as the local municipal requirements in the Lehigh Valley are concerned, the storage and regulation of small tributaries would probably suffice for many years as the dependable yield is nearly 1,000,000 gallons daily per square mile for completely regulated drainage areas in this vicinity.58/

In reference to present needs the Pennsylvania Department of Health in a report to the Pennsylvania State Planning Board in March 1935 listed 4 communities with a total population of 1,128 persons now depending on private wells and springs which it felt should have public supplies.

The same report mentioned Topton with a population of 1,720 persons where an order has been issued as a condition to a permit issued, to install a chlorination plant.

A P.W.A. project has been approved to provide a new reservoir and improvements to water works at Allentown at an estimated cost of $1,750,000.

Bethlehem needs additional filters and a mixing basin.

These places are listed individually in Appendix A.

(d) Irrigation:--- No needs known.

58/ House Document 245 - Lehigh River -72nd Congress, 1st Session, Page 17.

(e) Water Power:--- As indicated in section IV-c existing water power development is confined to 19 small plants, all using the flow of the canal and with a total capacity of only about 2,600 horse-power. Power needs in the Basin are adequately met by the existing steam plants. Because of the large available supply of anthracite coal any development of hydro-electric power is limited by the competition of steam power. However, it might furnish a valuable unit in an interconnected system of large steam plants.59/

Because of the established trunk-line railroads on both banks of the lower portion of the river potential power developments in the Basin are limited to the headwater section of the main river and on the tributaries. The Army Engineers have investigated 59/ possible developments and find that these are not attractive for power production alone because of the high costs but that future developments for municipal water supply in combination with power may be feasible.

Two projects have been considered:

1. Construction of dams near the mouth of Tobyhanna River and Bear Creek. Installed capacity 22,000 kilowatts at an estimated total cost of $5,326,500.

2. Construction of dam at mouth of Tobyhanna River with a high level conduit to Mauch Chunk. Installed capacity 103,200 kilowatts at an estimated cost of $25,164,400.

Neither project can be regarded as independently feasible; but if

59/ House Document 245, Lehigh River - 72nd Congress, 1st Session, Page 6.

the impounded water could be used for municipal water supply a combined and feasible project might be developed.

If the outflow from the power house in project #2 could be taken unpolluted to Easton the flow of 366 c.f.s. at an elevation of 490 feet should have considerable value.

Incidental flood protection would be provided by these projects and some expenditures for such protection would seem justifiable.

(f) Drainage:--- None of importance known.

(g) Recreation and Wild Life:--- As indicated in part IV-g, existing park and recreational lands, State Forest lands and State owned game lands are inadequate. Recommendations have been made for the acquisition of an additional 136,698 acres of Government owned forest and game lands and 2,465 acres of State park and recreation lands.

Under the program of the Works Progress Administration 4 projects for fish protection and fish conservation at an estimated cost of $27,431 have been authorized for the Basin. The Pennsylvania Fish Commission is re-stocking the smaller unpolluted streams with game fish.

(h) Rectification of Existing and Prevention of Future Contamination:--- The contamination of streams in the coal region by culm and sulpher water from the mines presents a serious problem. There is a definite need for the abatement of pollution of this nature. Since the presence of mine wastes in the water courses is due to causes within the control of the mining companies efforts should be made to contact the coal mine operators to work out methods of preventing pollution at the source.

If the entry of culm into headwater streams were prevented, most small streams would to a large extent clear their beds of mine wastes within a few years. It would be necessary, however, to dredge immense amounts of culm from the larger streams. 60/ To accomplish this a survey, similar to the one now in progress on the Schuylkill River, should first be made. This survey should determine how much culm is in the rivers, headwaters and at the sites of mining operations. A big problem, as yet unsolved, is what to do with the culm if it is dredged out of the river. Efforts should be made to find a market for it.

Where streams receive sewage, mine water may be beneficial and act as a germicide or neutralizing agent. Hence, a large reduction in the amount of mine waste being received by the Lehigh might result in a corresponding increase in the seriousness of pollution from sewage.

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60/ Water Resources Inventory Report - Part X.

SCHUYLKILL RIVER SUB-BASIN

## I GENERAL DESCRIPTION OF THE SCHUYLKILL BASIN 61/

(a) Maximum Length:---Approximately 86 miles.

(b) Maximum Breadth:---Approximately 42 miles.

(c) Area:---1,915.8 square miles.

(d) Physiography:---The northern portion of the Basin lies in the Ridge and Valley Section, and the southern portion in the Piedmont Plateau.

Topography:---The Basin is mountainous in the northern portion; at Hamburg the river enters the Piedmont Plateau, passing through South Mountain in the vicinity of Reading, below which lies a broad, rich, rolling agricultural country.

Geology:---The headwaters are in the anthracite coal measures, which are separated by anticlinal waves of Pottsville conglomerate; thence the river cuts through formations of shale and sandstone into Berks County, passing for about 10 miles through Hudson River shales and entering limestone section drained by Tulpehocken and Maiden creeks. Below Reading it meets a trap formation and then flows through red sandstone to below Norristown, where it flows again into a limestone district, from which it passes

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61/ Source:---Paragraphs (a) and (b): scaled from stream Map of Pennsylvania - 6 miles = 1 inch. Paragraphs (c) and (d) Water Resources Inventory Report, Part III - Gazatteer of Streams - Pennsylvania - Water Supply Commission, Harrisburg, Pennsylvania, 1916. Paragraph (f) Preliminary Report of Pennsylvania State Planning Board, Harrisburg, Pennsylvania December, 1934. Page 71.

through schist formations and finally through the gravel of Philadelphia County.

Channel:--- The channel is sinuous, through rough, rocky valleys between steep mountain ridges, cutting through ridges in places. Below the last gap at Port Clinton the stream enters a more rolling country, where it winds through wide bottom lands.

Profile:--- Rate of fall per mile:---

| From | Elevation | To | Elevation | Distance | Rate of Fall |
|---|---|---|---|---|---|
| Tuscarora | 900 | Port Carbon | 630 | 10 miles | 27 feet |
| Port Carbon | 630 | Reading | 200 | 44 miles | 9.8 feet |
| Reading | 200 | W. Manayunk | 20 | 61 miles | 3.0 feet |
| W. Manayunk | 20 | Mouth | | 14.5 miles | 1.3 feet |

(e) Cover:--- See Table IX. See Reconnaissance Land Use Map (Fig. II) showing the distribution of the various types of cover.

(f) Climate:--- The Mean Annual Precipitation is 40 to 55 inches. Excessive rains are not infrequent, and amounts in excess of 7 inches have been recorded on numerous occasions. The average annual snow fall is moderately heavy in the northern portion, but is comparatively light in the southern part. The mean annual temperature is 48° to 54°. Temperatures of 100° or higher are seldom recorded in this section, but high relative humidity sometimes makes the temperatures oppressive. The winters are mild, there being an average of less than 100 days with the minimum temperature below the freezing point, while zero temperatures are not reached more than two or three times during a winter season. The prevailing winds are from the northwest in winter, and the southwest in summer, and the wind movement is generally light or moderate.

(g) General Relation to Adjoining Basins:--- The Schuylkill Basin is bounded on the north by the Lehigh Basin, on the west by the Susquehanna Basin, on the south and east by the Lower Delaware Basin.

## TABLE IX

APPROXIMATE FOREST AND CLEARED LAND CLASSIFICATION.

SCHUYLKILL DRAINAGE SUB-BASIN

| CLASSIFICATION | AREA | PERCENTAGE |
|---|---|---|
| Forested | 321,000 Acres | 26% |
| Cleared | | |
| Non-farm | 74,000 Acres | 6% |
| Farms | 663,000 Acres | 54% |
| Urban, R. R., Highways, etc. | 168,000 Acres | 14% |
| Total Land * | 1,226,000 Acres | 100% |

* Excludes area of water in the largest rivers. U. S. Census "Land Area."

Note: Prepared from "County Area" data in the files of the Department of Forests and Waters, assuming parts of counties in watershed have same proportion of each land class as the entire county.

## II HUMAN OCCUPANCY

In 1930, the Schuylkill Basin had a population of 2,590,067 persons. 62/ This comprised about 27 per cent of the population of Pennsylvania and 2.1 per cent of the population of the United States. The average density of population in the Basin was 1,350 per square mile. This is high on account of Philadelphia.

Figure III shows the population distribution by Drainage Basins for the year 1930.

(a) Cities and Towns:--- Information regarding the number, classification by population, size and rate of development, and general character of cities and towns of the Basin is given in Tables X and XI.

(b) Rural Development:---

1. Agricultural 63/:--- The northern portion of the Basin lies in the anthracite coal region and contains large forested areas as shown by the Land Use Map (Fig. II). The north central portion lies in the Lehigh Diversified Farming Region while the south central portion is in the Manor Dairy and Poultry Region. The southeastern portion of the Basin is in the Philadelphia County Estate and Truck Crop Region.

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62/ Based on U. S. Census 1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each Basin is estimated as proportional to area. Towns on the line are placed in one Basin or the other.

63/ Preliminary Report, Pennsylvania State Planning Board - Harrisburg, Pennsylvania, December 1934. Page 106.

TABLE X

POPULATION CLASSIFICATION OF SCHUYLKILL BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934 ** Population | ESTIMATED 1934 ** Per Cent of Total Basin | ESTIMATED 1934 ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CITIES & BOROS | | | | | | | | | | | | | |
| 100,000 or Over | 2 | 1,372,657 | 81.0 | 2,062,132 | 79.6 | 83.7 | 1,976,505 | 78.5 | 82.9 | +689,475 | + 50.2 | -85,627 | -4.3 |
| 50,000 to 100,000 | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | - |
| 25,000 to 50,000 | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | - |
| 10,000 to 25,000 | 6 | 73,896 | 4.4 | 115,363 | 4.5 | 4.6 | 118,391 | 4.7 | 5.0 | + 41,467 | + 56.1 | + 3,028 | +2.6 |
| 5,000 to 10,000 | 5 | 18,950 | 1.1 | 37,178 | 1.4 | 1.5 | 37,522 | 1.5 | 1.6 | + 18,228 | + 96.2 | + 344 | + .9 |
| 2,500 to 5,000 | 19 | 25,960 | 1.5 | 67,766 | 2.6 | 2.8 | 70,391 | 2.8 | 3.0 | + 41,806 | +161.0 | + 2,625 | +3.9 |
| Under 2,500 | 46 | 17,810 | 1.1 | 43,978 | 1.7 | 1.8 | 45,504 | 1.8 | 1.8 | + 26,168 | +146.9 | + 1,526 | +3.5 |
| TOTAL CITIES & BOROS | 78 | 1,509,273 | 89.1 | 2,326,417 | 89.8 | 94.4 | 2,248,313 | 89.3 | 94.3 | + 817,144 | + 54.1 | -78,104 | -3.5 |
| TOWNSHIPS | - | 184,865 | 10.9 | 263,650 | 10.2 | -- | 270,591 | 10.7 | -- | + 78,785 | + 42.6 | + 6,941 | +2.6 |
| Unincorporated Villages | - | -- | -- | * 136,781 | 5.3 | 5.6 | 136,781 | 5.4 | 5.7 | -- | -- | -- | - |
| Scattered | - | -- | -- | 126,869 | 4.9 | -- | 133,810 | 5.3 | -- | -- | -- | + 6,941 | +5.5 |
| TOTAL Population Residing in Communities | - | -- | -- | 2,463,198 | 95.1 | 100.0 | 2,385,094 | 94.7 | 100.0 | -- | -- | -78,104 | -3.3 |
| GRAND TOTAL SCHUYLKILL SUB-BASIN | - | 1,694,138 | 100.0 | 2,590,067 | 100.0 | -- | 2,518,904 | 100.0 | -- | + 895,929 | + 52.9 | -71,163 | -2.8 |

* 1934 Estimate by Rand McNally & Company. (1900 Per Cent of Pennsylvania Population in Schuylkill Basin 26.8-of U.S. 2.2

** Estimate by Pennsylvania State Planning Board. (1930 Per Cent of Pennsylvania Population in Schuylkill Basin 26.9-of

TABLE XI

CLASSIFICATION OF CITIES AND BOROS IN SCHUYLKILL BASIN

| Cities and Boros | County | Population-1930 U. S. Census | Percent Increase 1900-1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 100,000 & Over (2) | | 2,062,132 | 50.2 | |
| Reading | Berks | 111,171 | 40.8 | T & M |
| Philadelphia Co. | | 1,950,961 | 50.8 | M |
| 10,000 to 25,000 (6) | | 115,363 | 56.1 | |
| Phoenixville | Chester | 12,029 | 30.8 | M |
| Conshohocken | Montgomery | 10,815 | 87.7 | M |
| Norristown | Montgomery | 35,853 | 61.0 | M |
| Pottstown | Montgomery | 19,430 | 41.9 | M |
| Pottsville | Schuylkill | 24,300 | 47.5 | (M) & M |
| Tamaqua | Schuylkill | 12,936 | 78.0 | (M) & M |
| 5,000 to 10,000 (5) | | 37,178 | 96.2 | |
| Bridgeport | Montgomery | 5,595 | 80.7 | T & M |
| Lansdale | Montgomery | 8,379 | 204.2 | M |
| Minersville | Schuylkill | 9,394 | 95.1 | (M) |
| St. Clair | Schuylkill | 7,296 | 57.3 | (M) |
| Schuylkill Haven | Schuylkill | 6,514 | 78.3 | M |
| 2,500 to 5,000 (19) | | 67,766 | 161.0 | |
| Birdsboro | Berks | 3,542 | 56.4 | M |
| Boyertown | Berks | 3,943 | 130.7 | M |
| Hamburg | Berks | 3,637 | 57.1 | M |
| Kutztown | Berks | 2,841 | 113.9 | M |
| Mt. Penn | Berks | 3,017 | -- | M |
| Shillington | Berks | 4,401 | -- | M |
| West Reading | Berks | 4,908 | -- | M |
| Wyomissing | Berks | 3,111 | -- | M |
| Perkasie | Bucks | 3,463 | 92.1 | M |
| Spring City Boro | Chester | 2,963 | 15.5 | M |
| Myerstown | Lebanon | 2,593 | -- | (M) |
| Ambler | Montgomery | 3,944 | 109.3 | M |
| Jenkintown | Montgomery | 4,797 | 129.4 | M |
| Narberth | Montgomery | 4,669 | 451.2 | M |
| Royersford | Montgomery | 3,719 | 42.7 | A |
| Soudertown | Montgomery | 3,857 | 258.1 | A & M |
| W. Conshohocken | Montgomery | 2,579 | 31.7 | M |
| New Philadelphia | Schuylkill | 2,557 | 92.8 | (M) |
| Port Carbon | Schuylkill | 3,225 | 81.3 | (M) |
| Under -- 2,500 (46) | | 43,978 | 146.9 | |
| Total (78) Cities & Boros | | 2,326,417 | 54.1 | |

* A - Agriculture (M) - Mining T - Transportation M - Manufacturing

Study of the Land Use Map (Fig. II) indicates that most of the land in the Basin except that at the northern end is "above average" or "superior" farm land with scattered areas of forest land.

Being close to large metropolitan areas, and having some of the best agricultural lands in the State, this region should continue to be a prosperous agricultural district.

The following table gives statistics pertaining to counties mainly within the Basin and shows trends in Agricultural Development. The trend has been downward from 1900 to 1930 but shows a decided reversal for the past 5 years. The farm population for the area involved was 91,019 in 1930. This increased to 102,077 in 1935.

TABLE XII

Number of Farms and the Amount of Land in Farms for Counties Located Mainly in the Schuylkill Basin

| Year | No. of Farms | Land in Farms (Acres) | Per Cent of Total Area | Per Cent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 23,520 | 1,438,604 | 74.2 | 7.4 |
| 1910 | 21,611 | 1,380,864 | 71.2 | 7.4 |
| 1920 | 19,673 | 1,323,359 | 68.2 | 7.5 |
| 1925 | 18,546 | 1,182,626 | 61.0 | 7.3 |
| 1930 | 16,011 | 1,134,835 | 58.5 | 7.4 |
| 1935 | 17,873 | 1,172,920 | 60.5 | 7.4 |

Source - Census of Agriculture -- U. S. Department of Commerce.

2. Industrial (decentralized):--- The major decentralized industries of the Schuylkill Basin include the production of coal, crushed stone and

building stone, textiles and food products.

3. Mining (including petroleum):--- The upper end of the Basin lies in the lower portion of the anthracite coal mining region in Schuylkill County. The most important anthracite mining areas of this county, however, fall on the other side of the divide in the Susquehanna Basin and the coal mining statistics for the county are included in the report of the Susquehanna Basin.

Quarrying of limestone and trap-rock as well as building and monumental stone is an important industry.

4. Lumbering:--- The lumbering industry is of no importance in the Schuylkill Basin. There are some fair sized areas of forest land in the northern portion of the Basin, however, which may be developed in the future to produce some forest products.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies Under Sections (a) and (b).

1. Cities and Towns:--- Study of Tables X and XI indicates the rapid growth of cities and boros in the Basin between 1900 and 1930. It will be noted that while this group as a whole increased about 55 percent the smaller places having populations of under 10,000 increased to a much greater extent averaging about 100 per cent.

The population of Philadelphia constitutes the large proportion of the Basin's population and so weights the totals in Table X that rural population seems unimportant. If the places over 100,000 population (Philadelphia and Reading) are eliminated, however, the population of townships will be seen to be about equal to that of boros and cities. It will be noted that there has been a substantial increase in township pop-

ulation over the period considered as well as in cities and boros.

During the past five years there has been a "back to the land" movement, particularly noticeable in the case of Philadelphia. It will be noted, however, that the population lost by Philadelphia during this period was not absorbed by rural districts in the Schuylkill Basin.

2. Agriculture:--- Trends in agricultural development shown in Table XII indicate a dropping off in number and area of farms. This is in line with improved agricultural production methods and the consequent decrease in needed acreage and manpower. The reversal in trend during the past five years is believed to be temporary and is probably accountable to the fact that much land formerly abandoned as incapable of producing an adequate return is now occupied by persons forced to leave cities by depressed industrial conditions.

As may be seen by examination of the Land Use Map (Fig. II) all except the northern end of the Schuylkill Basin is rich agricultural land. This section is one of the most productive agricultural sections in the State and with its convenient location adjacent to large metropolitan areas is expected to continue to enjoy profitable agricultural development. It is expected, however, that the poorer lands in the area not needed for agricultural use will gradually be put to other uses of which the most important will be forestry and recreation.

3. Industry:--- The general situation regarding trends in anthracite coal mining has been discussed under this heading in the Report on the Lehigh Basin.

A widely diversified industrial development exists in the Schuylkill Valley in addition to its agricultural development. Metal products, textiles

and food products are the most important.

There is every reason to expect this Valley with the Philadelphia Metropolitan district at its lower end will continue to thrive and develop.

(d) Transportation Facilities:---

1. Waterways:--- See section IV (a).

2. Highways:--- The Basin has a system of well paved highways connecting all the population centers.

3. Railroads:--- The principal railroads operating in the Basin are the Pennsylvania Railroad and Philadelphia and Reading Company.

These railroads connect the population centers and run in general parallel to the streams of the Basin.

4. Airports:--- The United States Department of Commerce, Airway Bulletin Number 2, September 1, 1934, lists 6 commercial or municipal airports within the area of the Basin.

## III STREAMS OF THE BASIN 64/

(a) Schuylkill River Main Stream

1. Source:--- In Locust Mountains, near Tuscarora, Schuylkill County; elevation 1,160.

2. Course:--- Southeasterly, to Delaware River at League Island Navy Yard below Philadelphia.

3. Length:--- 131 miles along stream.

4. Drainage Area:--- 1,915.8 square miles.

5. Discharge:--- Gaging station at Philadelphia, Pennsylvania.

Drainage Area above station 1,893 square miles.

| | | |
|---|---|---|
| Mean Annual Discharge 12 years (1903-12,1931-34) | | 1.30 c.s.m. |
| Maximum Discharge | October 4, 1869 | Not determined. |
| Minimum Discharge | September 20, 1932 | 0.02 c.s.m. |

(b) Little Schuylkill River Tributary to Schuylkill River.

1. Source:--- Formed by junction of East and West branches in Rush Township, Schuylkill County; elevation 1,070.

2. Course:--- Southerly to Schuylkill River at Port Clinton; elevation 410.

64/ Source for all streams except discharge data - Water Resources Inventory Report, Part III, Gazetteer of Streams. Pennsylvania Water Supply Commission. - Harrisburg, Pennsylvania - 1916. Discharge data:- Pennsylvania Department of Forests and Waters, and U. S. Geological Survey. - Harrisburg, Pennsylvania.
Note: Figures on maximum discharge in March 1936 are advance unpublished data.

3. Length:--- 27 miles along stream.

4. Drainage Area:--- 137.9 square miles of mountainous country, narrow valley flanked with steep high hills.

5. Discharge:--- Gaging station at Tamaqua.

Drainage Area above station 42.9 square miles.

| | | |
|---|---|---|
| Mean Annual Discharge | 16 years (1916-1917, 1919-34) | 2.19 c.s.m. |
| Maximum Discharge | August 24, 1933 | 87.2 c.s.m. |
| Minimum Discharge | December 18, 1930 | 0.042 c.s.m. |

(c) Maiden Creek Tributary to Schuylkill River.

1. Source:--- In Shockary Ridge, Lynn Township, western Lehigh County; elevation 720.

2. Course:--- Westerly into Berks County; thence southerly to Schuylkill River two miles southeast of Leesport, elevation 254.

3. Length:--- 26 miles along stream.

4. Drainage Area:--- 215.8 square miles of narrow valley in upper portion widening to rolling hills in lower portion. Principally slate formation in upper Basin; extensive limestone formation in lower Basin.

5. Discharge:--- No data available.

(d) Tulpehocken Creek Tributary to Schuylkill River.

1. Source:--- About 2 miles northeast of Lebanon, Lebanon County, elevation 630.

2. Course:--- Easterly to Schuylkill River opposite Reading; elevation 200.

3. Length:--- 37.5 miles along stream.

4. Drainage Area:--- 217.6 square miles. Upper Basin lies in broad,

rolling agricultural region, while Lower Basin is more broken and hilly except near mouth where country is rolling. Extensive limestone formation in Upper Basin; slate and sandstone formations in Lower Basin.

5. Discharge:--- No data available.

(e) Manatawney Creek                    Tributary to Schuylkill River.

1. Source:--- In District Township, east Berks County; elevation 890.

2. Course:--- Southerly, by a circuitous route, into Montgomery County to Schuylkill River at Pottstown; elevation 122.

3. Length:--- 21.5 miles along stream.

4. Drainage Area:--- 90.4 square miles. Upper eastern portion of Basin is rough and hilly country containing iron ore beds; middle, western and lower portions contain rolling agricultural lands.

5. Discharge:--- No data available.

(f) French Creek                    Tributary to Schuylkill River.

1. Source:--- In Union Township, southern Berks County; elevation 620.

2. Course:--- Southeasterly to Schuylkill River at Phoenixville; elevation 78.

3. Length:--- 22 miles along stream.

4. Drainage Area:--- 71 square miles. Upper Basin is rough and hilly; Lower Basin more rolling.

5. Discharge:--- No data available.

(g) Perkiomen Creek                    Tributary to Schuylkill River.

1. Source:--- Near Seisholtzville, in Longswamp Township, Berks County; elevation 875.

2. Course:--- Southeasterly into Montgomery County; thence southerly to Schuylkill River near Perkiomen Junction, elevation 73.

3. Length:--- 37.5 miles along stream.

4. Drainage Area:--- 361.8 square miles of broken and hilly country with irregular main valley, varying from broad rolling agricultural land to narrow stretches flanked with steep high hills. Generally gneiss formation with intrusions of trap rock.

5. Discharge:--- Gaging station at Graterford, Pennsylvania.

| | | | |
|---|---|---|---|
| Drainage Area above station - 279 square miles. | | | |
| Mean Annual Discharge 10 years (1914-16, 1926-34) | | 1.47 | c.s.m. |
| Maximum Discharge | August 23, 1933 | 124. | c.s.m. |
| Minimum Discharge | September 25, 1932 | 0.038 | c.s.m. |

(h) Wissahickon Creek — Tributary to Schuylkill River

1. Source:--- One mile east of Lansdale, Montgomery County, elevation 440.

2. Course:--- Southerly, by a circuitous route to Schuylkill River at Wissahickon.

3. Length:--- 23 miles along stream.

4. Drainage Area:--- 63.8 square miles of rolling agricultural country, thickly settled; broad main valley, except in lower course where stream flows through narrow gorge 200 feet deep. Generally red shale and sandstone formations, with a gneiss formation in lower course.

5. Discharge:--- Gaging station at Wissahickon discontinued July, 1906.

| | | | |
|---|---|---|---|
| 65/ Drainage Area above station - 65.0 square miles. | | | |
| Mean Annual Discharge, 4 years (1900-03, 1905-06) | | 1.57 | c.s.m. |
| Maximum Discharge | July 22, 1897 | 43.1 | c.s.m. |

65/ Information from House Document #179, 73rd Congress, 2nd Session. Pg. 63.

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENT

(a) Navigation:-

The Schuylkill River is navigable for ocean-going vessels from its mouth to Fairmount Dam in Philadelphia.

The Schuylkill River was canalized, 1816 to 1825, at a cost of $2,200,000 by the Schuylkill Navigation Company, from Philadelphia to Mill Creek. At the present time the Canal is leased to the Philadelphia and Reading Railroad Company which maintains it for a length of ninety-miles above Philadelphia to Port Clinton. It has a prevailing depth of 6 to 6.5 feet and a width of 40 to 45 feet at the bottom. The locks are 110 feet by 18 feet. 66/

An application to the State Legislature for permission to abandon the canal was made about 25 years ago, but was not granted.

The adequacy of existing navigation development is not known. The declining traffic on the present canal would seem to indicate that the existing facilities are more than adequate.

(b) Flood Control:-

The flood problem in the Schuylkill Basin is an important one and existing provisions for control are inadequate. The following municipalities are subject to serious flood damages:- Manayunk, St. Clair, Collegeville and Norristown. Municipalities subject to minor flood damage are Bridgeport, Conshohocken, Hamburg, Middleport, New Philadelphia, Phoenixville, Port Carbon, Pottstown, Pottsville, Reading, Royersford, and Schuylkill Haven. 67/

66/ Water Resources Inventory Report - Part IX Navigation.

67/ List prepared by Pennsylvania State Planning Board in cooperation with Pennsylvania Department of Forests and Waters, 1935.

1. By Reservoirs and Detention Basins:- None of importance known.

The Panther Valley Water Company is building a large storage reservoir on Still Creek a tributary of the Little Schuylkill River. This reservoir will have a capacity of 2,500,000,000 gallons and will be used primarily as a water supply for the Lehigh Coal & Navigation Company.

The reservoir will have some importance for flood control of this valley.

2. By Levees:- None of importance.

3. Channel Improvements:-

None of importance. The main river channel below Philadelphia has been dredged by the United States Government at various times in order to maintain a navigable channel.

The Water and Power Resources Board of the Pennsylvania Department of Forests and Waters has conducted studies and established channel lines at Reading, Manayunk and a portion of Norristown. These channel lines were not adopted by Municipal Ordinance, and none of the recommended improvements have been made.

The State Water and Power Resources Board, however, is authorized by law to establish channel lines and to control by permit the encroachment of new construction. This law has been in effect since 1913.

(c) Municipal, Domestic and Industrial Supplies:- Upper Schuylkill Basin. In the vicinity of Philadelphia one company may serve water to many communities some of which are widely separated and in different drainage basins. Since it was not possible to separate the statistics in such cases it was necessary to consider the Philadelphia Metropolitan Area as including all of Bucks, Chester, Delaware, Montgomery and Philadelphia

counties as a group. This includes a portion of the Delaware Basin as well as the Schuylkill. The balance of the Schuylkill Basin is referred to as the Upper Schuylkill Basin.

The year-book of the Pennsylvania Department of Health for 1934 (unpublished) tabulates information on public waterworks in Pennsylvania as of May 31, 1934, where water is treated.

Computations made on the basis of this report indicate that 243,790 persons or approximately 87 per cent of the population (1934) of the Upper Schuylkill Basin residing in communities was [68/] served with treated water, either chlorinated or filtered or both.

Complete data are not available concerning places having untreated supplies. It is known, however, on the basis of the Pennsylvania Water Resources Inventory Report (1916) and reports of the Pennsylvania Geological Survey on "Ground Water in Southeastern Pennsylvania" that 3 communities in the Upper Basin having a population (1934) of 2,025 persons, were served by untreated public supplies.

Appendix A is a tabulation of all cities and boroughs in the entire Basin together with unincorporated places within townships having population of 500 or over. This tabulation lists for each community the status of water supply and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

1. Filtered Supplies:- The Department of Health Report lists 5 communities in the Upper Basin served by public water filtration plants. The population served comprises 128,300 people or about 46 per cent of the population (1934) of the Upper Basin residing in communities. [68/]

68/ See Table X. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand McNally & Co.

Many of these supplies are chlorinated as well as filtered.

2. Chlorinated Supplies:- This same report lists 33 communities in the Upper Basin having public water supplies without filters, but equipped with chlorination plants. These serve 115,490 persons or approximately 41 per cent of the population residing in communities. 68/

Philadelphia and Vicinity

According to sources previously quoted 2,629,630 persons comprising about 97 per cent of the total population (1930) of Bucks, Chester, Delaware, Montgomery and Philadelphia Counties were served treated water either filtered, chlorinated or both. Seven communities having a population of 6,451 persons were served by untreated public supplies.

1. Filtered Supplies:- In this section 76 communities were served with filtered water. The population served comprised 2,579,068 persons or about 95 per cent of the total population (1930).

2. Chlorinated Supplies:- There were 31 communities served by public water supplies without filters but equipped with chlorination plants. These served 50,562 persons or about 2 per cent of the total population (1930).

3. Industrial Supplies:- (Entire Basin). At the present time there is no State Department having jurisdiction over industrial water supplies and no complete data concerning them are available. The Water Resources Inventory Report listed industrial supplies (1916) but these data are obsolete.

(d) Irrigation:- None of importance known.

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68/ See preceding page.

(e) Water Power:-

1. Mechanical:-

The Water Resources Inventory Report of Pennsylvania lists several plants taking water from the Schuylkill Canal but the amount of water used is of little importance.

2. Hydro-electric:-

The Preliminary Report of the Pennsylvania State Planning Board for 1934 lists the following hydro-electric plants in the Schuylkill Basin:

| Location | Stream | Head (ft.) | H. P. |
|---|---|---|---|
| Manayunk | Schuylkill Canal | 23 | 2,800 |
| | Schuylkill River | 20 | 724 |
| West Bridgeport | Tulpehocken Creek | 6 | 225 |

(f) Drainage:- None of importance known.

(g) Recreation and Wild Life:- Counties mainly in the Basin (Berks, Chester, Montgomery, Philadelphia and Schuylkill) now contain 12,342 acres of State Land all of which is owned by the Game Commission.

In the 5 counties above mentioned are 27,219 acres of park and recreation land. This includes 9,294 acres of municipally owned land, 1,525 acres of State owned land and 16,400 acres of privately owned land, largely in golf courses, clubs, etc. This is considered inadequate and recommendations have been made 69/ for the future acquisition of an additional 45,500 acres of public park and recreational land, and 279,200 acres of government owned forest land.

The Pennsylvania Fish Commission is conducting a program of stream improvement for the smaller unpolluted streams, not subject to excessive floods, and is restocking them with game fish.

69/ Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934 - Page 170.

Perkiomen Creek attracts many tourists, pleasure seekers, and other visitors, especially during the summer months. Numerous low dams across the stream bed create pools for bathing and boating, and other pleasure facilities are abundant.

Fairmount Park, the largest municipal park in the world, and Pennypack Park both in the City of Philadelphia, offer recreational facilities for a large portion of the population of the Basin.

Chiefly because of pollution, recreational use of the Schuylkill River is confined to boating, canoeing and aquatic sports other than bathing. Should such pollution be removed, the Schuylkill would offer almost unlimited recreational possibilities.

(h) Correlated Uses:- The possibilities for coordinated use of water-supply properties as an adjunct to the regional park and parkway system have been worked out successfully elsewhere, although in this region there is no outstanding example of such coordination, except, perhaps, Fairmount Park.

(i) Imported and Exported Water Supplies:- None of importance known.

## V UNDERGROUND WATERS

See Report on Delaware Sub-Basin, page 25.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

The pollution of the streams of the Basin, especially in the Philadelphia area presents an important problem. The territory lying within the Schuylkill water-shed and situated above the boundaries of the City of Philadelphia has a population of 450,000 persons 70/ and a density of 250 per square mile. The water supplies for Pottstown, Royersford, Spring City, Phoenixville, Norristown and Bridgeport are obtained from the main stem of the river, and most of the industries are located along the river.

A survey of the Schuylkill River made by the Pennsylvania Sanitary Water Board in 1927 and 1928 indicated 71/ that the outstanding evidence of the sewage load during periods of low stream stage was the very high number of sewage organisms present in the raw water of the river at waterworks intakes below Reading. Another striking disclosure of the survey was that the discharge of industrial wastes in this highly industrialized valley, in general and with certain exceptions where large quantities of organic matter were discharged, had a relatively insignificant effect on the river.

Although it was recognized that the river was more or less continuously acid and noticeably affected by culm from the anthracite coal operations above Reading and that the river was at times acid from coal mine drainage downstream to within a few miles of Reading, no

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70/ "The Regional Plan of the Philadelphia Tri-State District" 1932, Page 521.

71/ "Sanitary Survey of Streams in Pennsylvania", a paper presented to Pennsylvania Waterworks' Operators Association, June 25, 1930 - by C. L. Siebert, Executive Engineer Sanitary Water Board, unpublished.

particular effort was made to identify the various sources of these anthracite coal mine wastes since there is as yet no law or agreement in effect governing these wastes, although negotiations have been begun looking toward a cooperative agreement with the anthracite coal industry to regulate the discharge of objectionable waste waters.

(a) Sewage:- The Pennsylvania Department of Health submitted a report to the Pennsylvania State Planning Board in March 1935 which listed in the Schuylkill River Basin 14 communities having sewage treatment works. These did not necessarily serve the entire population. The 1934 population of these communities was 207,027 persons 72/ or about 9 per cent of the Basin's community population. This did not include the city of Philadelphia, where only a small part of the sewage is treated. Eighty four per cent of the community population resided in Philadelphia.

The same report listed 19 communities having public sewers but no treatment works. These sewers empty into streams or into sewers of adjoining communities some of which have treatment works. Sewage from 2 of these communities (pop. 21,452) was treated at Philadelphia. The total population of communities having public sewers was not necessarily served by them. This population, however, in 1934 comprised 161,049 persons or about 7 per cent of the Basin's community population.

The report indicated that orders to install treatment works had been issued to Phoenixville and Telford Boroughs and whose combined population (1934) was 12,294. The case of the former has been referred to the State Attorney General, for action. These are not necessarily all the places needing treatment plants since orders are issued only in connection with permits granted on application of a community to extend

72/ See foot note 68/

or reconstruct its sewers.

Phoenixville Borough has a listed sewer project in the National Inventory of Works Projects. The estimated cost of a complete sanitary sewage system for this municipality is $750,000. A disposal plant P. W. A. project estimated to cost $803,636 for Conshohocken is pending.

The Board of Commissioners of Abington Township recently (July 23, 1936) passed an ordinance authorizing the sale of existing township sewage facilities and construction of a new $1,250,000 sewage system and disposal plant to be paid for over the next 30 years.

Mt. Penn, Radnor and Ambler are now constructing sewers under P. W. A. projects estimated to cost $310,909; $164,120 and $283,013 respectively. A $275,000 connecting sewer project was recently authorized for the City of Philadelphia by Mayor Wilson. A P. W. A. sewer project estimated at $205,454 is pending for Spring City.

Appendix B is a tabulation of all cities, boroughs and incorporated communities (over 500 population) within townships in the Basin. This lists the status of sewage disposal for each community.

(b) Trade Wastes:- As a result of the survey of the Schuylkill River by the Pennsylvania Sanitary Water Board [73/] it was determined that an effort should be made to secure cooperation toward abatement or minimization of the principal objectionable industrial wastes before resorting to any attempt toward abatement through court action. The resulting cooperative agreements resulted in a decrease of the organic load from industrial wastes by about seventy per cent and, also, a reduction of about sixty per cent was attained in the acid discharge to the river from metal working plants in their acid pickling processes and the like.

73/ See foot note 71/.

Encouraging as these figures are, the fact remains that the Schuylkill is still objectionably polluted.[74/] At times, the water coming from the Schuylkill intakes at Philadelphia is subject to objectionable tastes, although it has been stated that this does not affect the safety of the supply. Such conditions tend to cause people to resort to other sources for drinking water. Many feel that commercial spring water is a necessity.

While the Pennsylvania Department of Health has in its files a mass of data pertaining to pollution by trade waste, no comprehensive summary of factual data is available and the time allowed for this study does not permit the analysis of the above material to obtain such data.

(c) Oilfield and Mining Wastes:- The Schuylkill River, with its principal tributaries drains about three-fourths of the Southern Coal Field.[75/] Every stream of importance contains sulphur while five of them are loaded with culm. In time of floods deposits of culm are carried to the main stream and eventually into the Delaware River in such quantities as to be harmful to navigation.

The following quotation is from notes of a talk given by Colonel Lee, District Engineer, U. S. Army Corps at a meeting of A. S. M. E. Lehigh Valley Group, Reading, Pennsylvania, May 22, 1936.

"The Engineers Corps is interested in maintaining a 30 foot channel in the lower part of the Schuylkill River below the Fairmount Dam. Within the last few years it has been found necessary to excavate about 1,000,000 cubic yards per year from this channel of a mixture of

74/ "The Regional Plan of the Philadelphia Tri-state District", 1932. Page 513.

75/ "Water Resources Inventory Report" Part X, Water Supply Commission, Harrisburg, Pennsylvania, 1916. Page 55.

culm and mud (about 50-50)."

"This channel is filled up again with this material at every high water."

"These culm deposits in the river have restricted flow and aggravated the flood problem in the Schuylkill so that there are now damages amounting to about $200,000 annually."

"In view of these facts a survey of the river to determine the extent and location of the culm and to study this and the flood problem was approved."

"This survey is being carried on as a combined program with engineering and other personnel furnished by W.P.A. direction and supervision by Army Engineers, and with the project sponsored by the State Department of Forests and Waters."

The purpose of the survey is to find out how much culm is:

1. In the river.
2. At the head waters.
3. At actual site of mining operation and what to do with it.

This survey will accomplish one of the needs of the Basin as outlined in a comprehensive plan for flood control by the Association of Schuylkill River Municipalities. (See section VII - (b).)

(d) Silt and Erosion:- The Reconnaissance Erosion Survey of the State of Pennsylvania made by the Soil Conservation Service in May 1935, indicates that the Basin is, in general, subject to moderate, sheet erosion with "occasional gullies" and scattered portions subject to "moderate sheet erosion".

About 1,000,000 cubic yards of culm and mud (about 50-50) are dredged each year from the channel in the lower section of the river. (See Part VI - c )

(e) Irrigation and Drainage:- None of importance known.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:- The U. S. Army Engineers Corps maintains a 30 foot channel in the lower part of the Schuylkill River below the Fairmount Dam. The existance of adequate rail facilities would indicate that any improvement of the present canal or of the river for navigation above this point, is not warranted.

There is a great possibility for pleasure navigation on the Schuylkill with possibly a 6 ft. channel. Dams would be needed for low water control.

(b) Flood Control:- As indicated in part IV (b) the existing provisions for flood control are inadequate. Flood damages are estimated 76/ to amount to $200,000 annually.

The needs of the Basin for flood control are outlined in a report on Schuylkill River Flood Control Project submitted by the Association of Schuylkill River Municipalities, Reading, Pennsylvania, April 12, 1935 to the Pennsylvania State Planning Board.

This report includes proposals for flood control, stream pollution abatement and culm deposit removal and sets forth the following separate projects:

Comprehensive Surveys:- These include the establishing of channel lines, determining possible trends of mining operation for the next 5 years, tabulating water power and water supplies along the river and canal and the surveying and mapping of silt deposits within the lines of the river.

76/ See page 104.

Comprehensive Plan - The various projects are outlined in the probable order of execution.

Inventory of Complete Project:-

| | | |
|---|---|---|
| 1. | Removal of Channel encroachments | $ 1,000,000 |
| 2. | Excavation and disposal of coal silt dumps which encroach on channel lines and constructing dry slope retaining walls. | $ 1,000,000 |
| 3. | Constructing improved hydraulic cross sections and filling in unsanitary canal sections | $ 500,000 |
| 4. | Dredging silt deposit from river channel | $ 1,500,000 |
| 5. | Construction of flood retarding dams | $ 1,500,000 |
| 6. | Construction of local flood protection works | $ 2,000,000 |
| 7. | Reconstruction of certain existing river dams and demolition of others | $ 500,000 |
| 8. | Construction of low water run-off control works involving a pumped storage hydro-electric impounding lake and generating equipment. (This phase of the work as contemplated will be self-liquidating) | $ 2,500,000 |
| 9. | Engineering and Supervision | $ 420,000 |
| | Total | $10,920,000 |

The report concludes with a request that an initial appropriation of at least one million dollars be awarded so that certain proposals can be instituted immediately.

It should be noted that certain surveys proposed in the above plan have already been carried out or are being concluded. The State of Pennsylvania has set and monumented channel line as noted in

section IV-b and a survey to determine the location and amount of culm deposits is in progress as noted in section VI-c.

(c) Municipal, Domestic and Industrial Supplies:- Water supply for the City of Philadelphia is discussed in the report on the Delaware River.

It is doubtful whether there is a river of similar size in the United States, undeveloped by storage, which is utilized more intensively and completely for water supply than is the Schuylkill.[77] From a regional point of view the indications are that the present source of supply, both from surface streams and underground in certain sections of the region, are close to the present safe yield of the several supplies.

The necessity of providing more and more water for the populous area in the Basin for the future is inevitable. There is no other major facility or necessity of modern life, for the large cities at least, that requires more definite long-range planning and early commitment than those providing for the collection and distribution of adequate water supplies.

The communities now drawing on the Schuylkill River for water supply might find it expedient to join in some coordinated development of the upland sources such as the Neshaminy, Tohickon, and Perkiomen and the tributaries of the Upper Delaware and Lehigh, which have been recommended repeatedly, together with some further development of smaller tributaries within the area.

Another factor influencing the usuable sources of future

77/ The Regional Plan of the Philadelphia Tri-State District, 1932 - Page 495.

supply will be the spread of industry. There can be little doubt that industrial enterprise will continue to seek locations along important waterways where they find both land and water transportation, as well as a dependable water supply for manufacturing purposes.

It is highly probable that the future will find industries desiring to develop their own water supplies from nearby rivers, in the interests of economy, while municipalities will look to the tributaries for a better quality supply for human needs. 78/

In reference to present needs the Pennsylvania Department of Health in a report to the Pennsylvania State Planning Board in March 1935, listed 12 communities in the Upper Basin having a population of 5,190 persons (1934) now depending on private wells and springs, which it felt should be served by public supplies. Ten such communities with a combined population of 5,981 persons are found in the Philadelphia section.

The same report indicated that Birdsboro, Berks County, (Population 3,550) in the Upper Basin need improvements to an existing supply and has been ordered to make them by the Health Department as a condition to a permit granted.

Improvements to the Reading Water Works are under construction as a P.W.A. Project at an estimated cost of $2,674,433.00.

In the Philadelphia District the above report indicates the need for improvements to existing water works at 7 plants serving 24,380 persons. Orders have been issued to 15 other communities serving 130,260 persons to make improvements to existing supplies.

Improvements to water works are being constructed at P.W.A. Projects at 5 places in this district at a cost of $423,303.00.

78/ Regional Plan of the Philadelphia Tri-State District, 1932 - Page 507.

All these places are listed in the tabulation previously referred to.

(d) Irrigation:- No needs of importance known.

(e) Water Power:- As indicated in section IV-e there are only 3 hydro-electric plants in the Basin developing a total of 3,749 horsepower. Existing needs are adequately supplied, for the most part, by plants operated by steam.

The Army Engineers "308" Report indicates [79] that power development on Perkiomen Creek, the largest tributary of the Schuylkill, on a comprehensive scale, is not economically feasible. The Army Engineers' recommendations for power development on the main stream are not available. However Colonel Lee, District Engineer, U. S. Army Engineer Corps stated that large dams on the Schuylkill are not practical.[80]

(f) Drainage:- No needs of importance known.

(g) Recreation and Wild Life:- The high population density of the Basin requires correspondingly large recreational facilities. While there are numerous boating, bathing and other pleasure facilities on the tributaries the existing facilities for recreation appear to be inadeqate.

As indicated in part IV (g) recommendations have been made for the acquisition of additional park and recreation land and forest land.

The deep winding valley of the Schuylkill offers splendid

79/ Perkiomen Creek, Pennsylvania. House Document 482, 71st Congress, 2nd Session.

80/ See page 103 in Pollution - Part VI.

opportunities for the recreational development of its banks. As the industrialized population of this valley grows, the need for such development will become more evident than it is today.

The Regional Plan of the Philadelphia Tri-State District (1932) proposes a number of parks and parkways to meet the needs of the Basin for the next 50 years. A map showing the location of such parks and parkways is on page 242 of the Plan.

Colonel Lee of the Army Engineers states, 80/ that there was a great possibility for pleasure navigation in the Schuylkill with possibly a 6 foot channel. Dams would be needed for low water control. It would seem desirable to maintain the existing recreational pools and locks.

(h) Rectification of Existing and Prevention of Future Contamination:- "As long as Philadelphia continues to use virtually the entire low-water flow of the Schuylkill River for its water supply, it will be desirable progressively to reduce the volume and character of the polluting wastes that now enter it; even should the city decide to abandon the Schuylkill as a source of supply at some future date, it is quite probable that the growth of population and industry between Philadelphia and Reading will have reached a point that would indicate equal standards of purity for its own use. 81/

The comprehensive Flood Control Project submitted by the Association of Schuylkill River Municipalities, described in Section VII b, if realized would materially reduce the pollution of the Schuylkill.

80/ See Page 103.

81/ The Regional Plan of the Philadelphia Tri-State District, 1932, Page 521.

Methods of preventing pollution from culm at the source are being worked out by the Coal Mine Operators in cooperation with the State.

The $275,000 connecting sewer project recently authorized in Philadelphia and sewage treatment and disposal projects, under construction or pending, by the W.P.A. and P.W.A. in the Basin are steps toward the objective of diminishing the pollution of the river by sewage. The river will not be cleared, however, until adequate sewage disposal and intercepting sewer systems particularly in Philadelphia, are constructed.

CONCLUSIONS AND PROJECT LIST

FOR

DELAWARE RIVER BASIN IN PENNSYLVANIA

## VIII COMPREHENSIVE PLAN FOR DEVELOPMENT

A comprehensive plan for the development and conservation of the water resources of the Delaware River Basin in Pennsylvania is properly to be based upon the probable future use and occupancy of the Basin. This plan will be one part of the Master Plan for the area and for the State and, consequently, should be evolved as an integral part of the Master Plan.

The realization of any plan for the development of a drainage basin implies a certain degree of control. The amount of control necessary is largely dependent upon the extent and kind of present and potential water uses. For an intra-State stream, State control is usually adequate. But, the handling of an inter-State stream, such as the Delaware River, necessarily requires much cooperation between the states affected, both in the making of plans and in the adoption and administration of regulations.

The Delaware River Basin includes parts of four States, each of which has major interests in the development and use of the River. Although certain of these interests are common to all four States, others are of more individual concern. Interests which are common to two or more States may occupy disparate positions in rank of importance to the individual States. Likewise the immediacy of problems may vary widely among the different States. For these reasons, difficulties and delays have been experienced in effecting workable inter-State compacts for the development of the Delaware River.

With the years, the need for effective cooperation between the States in matters of use and protection of the waters of the Delaware River Basin has become more acute and more widely understood. A promising step has now been taken in this direction, through the establishment of the Interstate Commission on the Delaware River Basin. It is hoped that this Commission, implemented by facts and plans supplied by the planning boards and by the health and water engineers of the several states, will be instrumental in bringing about the needed inter-State compacts and regulations.

This recently established Commission has adopted pollution abatement as its first objective. Although pollution is admittedly the major problem of the Basin at the present time, municipal water supply will probably become the major issue of the future. The relationships between pollution, municipal water supply, low flow control, navigation, hydro-electric power generation, flood control, recreation and erosion must all be considered before a satisfactory solution to the pollution problem can be evolved. These and other related studies should form the basis of the comprehensive plan for the development of the Delaware River Basin based on the principles of multiple use.

While it is not possible to formulate a really comprehensive plan of development of water resources in advance of the Master Plan, a program of development consisting of certain projects proposed by various agencies, the need for which has been made evident by this study, can be outlined. The major projects under their various general headings are discussed in this section. Section IX is a complete list of all the projects the locations of which are shown in Figure I. (Project Map)

(a) Navigation: - As indicated in Part VII, improvement of the Delaware River above Trenton, N. J., and of the Lehigh and Schuylkill Rivers above Easton apparently is not economically justified at the present time. The existing improvement of the Delaware River below Trenton, N. J. appears to be adequate for the present needs.

Existing improvements on the lower Schuylkill are being menaced by silt accumulation which are being washed into the navigation channel. Since 1933 between 1 and $1\frac{1}{2}$ million cubic yards of silt have been removed annually from the lower channel. Half of this material is fine coal. The silting of the channel is a major problem of the Basin. Intensive studies are being made by the Corps of Engineers, U. S. Army, to determine the amount of silt now in the River system and the sources and extent of culm banks in the Basin. Upon the completion of these surveys, steps should be taken to stabilize the culm banks so that the culm will not be washed into the channel.

Proposals have been made for increasing the depth of the channel of the Delaware River at and below Philadelphia to 40 feet. To date, no figures are available as to the cost and the benefits of this project. However, such a project will probably be justified in the near future.

(b) Flood Control: - While flood control is important on the main stem of the Delaware River it is not a major problem. However, one control project is recommended; that of raising the height of the sea wall at Frankfort Arsenal, Philadelphia, to protect it from damage caused by flood flows.

On the Lehigh River, flood control is a major problem. Although some attractive storage sites exist on the tributaries, the cost of improving them for flood control purposes would exceed the benefits derived

from their limited storage capacities. Some local control may be secured by channel improvements and the construction of levees. While not justified for flood control purposes alone, the construction of Tobyhanna Reservoir, capacity 28 billion gallons, would probably be justified for multiple use. This reservoir would provide a substantial measure of flood protection and would be useful for domestic water supply or power generation purposes and in low-flow control.

On the Schuylkill River, floods have caused great damage at frequent intervals. The flood hazard could be reduced by the removal of culm and silt from the channel, and by the construction of local flood protection works and retarding dams.

A complete solution of the problems of flood control and flood prevention in the Lehigh and Schuylkill Valleys by the erection of flood control structures is not economically feasible at the present time. Existing improvements such as railroads, highways, bridges, and boroughs occupy the stream banks of the valleys so that most of the possible reservoir sites cannot be used for water storage purposes without incurring excessive property damages. Buildings and industries occupy the flood plains and restrict the channel width to such an extent that the cost of erecting levees and dykes for local protection would not be justified in the majority of cases.

It is recommended, however, that channel lines be established in all areas subject to serious floods, and that local zoning be adopted to prohibit the erection of certain types of structures in areas which are subject to such floods and which cannot be adequately and economically protected by flood control works. It is further recommended that such zoning ordinances provide for the gradual elimination of non-conforming uses from

areas subject to serious floods.

(c) Municipal, Domestic and Industrial Supplies: - The Delaware River will fulfill its highest use to a vast metropolitan population if used as a source of water supply. New York City, Philadelphia, southeastern Pennsylvania and northeastern New Jersey communities must be provided with additional and better water supplies for the future, probably to be taken most economically from the upper stretches of the Delaware River and its tributaries.

The use of the Delaware River as a source of municipal water supply does not imply that all other water uses should be eliminated. In the Delaware Basin it is both necessary and desirable that the waters be used for multiple purposes. Care must be taken, however, to insure that such multiple uses are not, at any time, unduly detrimental to municipal and domestic water supplies. Municipalities, however, should not be absolved from exercising a reasonable amount of care and ingenuity in safeguarding and treating their water supplies.

From the viewpoints of economy, multiple use and comprehensive planning, diversions for municipal supply should be made at the lowest downstream point at which the water will meet the necessary requirements of purity. Such a policy would allow the upper reaches of the stream to be used for restricted recreational purposes, hydro-electric generation and stream control. The recreational use of the upper portion of the Basin is an important one and susceptible to much further development. The most promising reservoir sites should be conserved for such future multiple-use possibilities as described above.

Philadelphia Metropolitan Area: - At the present time Philadelphia is using approximately 330 million gallons of water daily for

municipal supply. About half this supply is drawn from the Delaware River at Torresdale and the other half form the grossly polluted Schuylkill River above Fairmont Dam. There is a rapidly growing demand on the part of the public for abandoning the present source of supply and for obtaining new sources of relatively clean water. Although many studies have been made for determining the best source for the future water supply, the problem remains controversial.

The Blue Mountain Streams - Bushkill, Broadheads, Pocono and McMichaels Creeks on the Delaware, and Tobyhanna, Big Creek Pohopoco, and Mud Run on the Lehigh River - are regarded as the most favorable sources of supply for Philadelphia from the criterion of purity. These sources could furnish 500 million gallons daily at an estimated total cost of $304,000,000. However, the diversions of these head waters for the Philadelphia municipal supply would prevent the use of this water for any other purposes above the tidal basin at Philadelphia.

A project has been proposed for the development of the Perkiomen, Tohickon and Neshaminy watersheds to supply 430 MGD at a total cost of $116,100,000.

The U. S. Engineers "308" Report on the Delaware River, 1934, proposed a gravity supply of 548 MGD for Philadelphia to be drawn from an impounding reservoir on the Upper Delaware River at Tock's Island. This water would be conveyed through a conduit to a reservoir at Warrington, on Neshaminy Creek, on the outskirts of Philadelphia. Neshaminy Creek would supplement this supply by 18 MGD. From the Warrington Reservoir, the water would be conveyed to the existing Queen Lane Reservoir in Philadelphia.

The Tock's Island Reservoir would provide a storage period of

from 86 to 10 days. The lower limit would be reached in the event of a flood stage after the reservoir has already been filled to capacity. The Warrington Reservoir would provide an additional storage period of more than 40 days. The water would, however, require filteration and sterilization, but would be of a quality superior to that now utilized by the Philadelphia water works.

The estimated cost of this development (based on 1930 data) would be $117,001,500. A reduction of $33,703,800 for capitalized revenues is estimated, which would make the net cost to Philadelphia $83,292,700. This cost does not include a new filteration plant and necessary changes in the system. As planned, the reservoir at Tock's Island could also furnish 400 MGD to northeastern New Jersey communities and would provide a large amount of hydro-electric power. It would also afford a substantial measure of low flow control.

An additional supply of 73 MGD could be obtained from a proposed reservoir at Tohickon, under which site the proposed Tock's Island-Warrington conduit would pass. The estimated cost of the Tohickon Reservoir is $3,327,000.

The Pennsylvania Department of Health has cited objections which might be raised to the proposed Tock's Island development. Reference was made to the possibility that, occasionally, water of an inferior quality might be delivered due to possible reservoir drawdown of 60 feet for power purposes; to brief storage during times of freshets; and to possible contamination at Port Jervis.

It is recommended that a study project be instituted to determine the best practical source for an adequate water supply for metropolitan

Philadelphia, considering its relation to multiple water use in the Basin. Meanwhile, new filter capacity and needed improvements should be constructed at the Philadelphia water works without further delay.

Delaware Basin Excluding Metropolitan Philadelphia: - Supplies of water for municipal, domestic and industrial purposes appear to be adequate for the remainder of the Basin in Pennsylvania. Section IX contains a list of proposed projects for improving the various local water supply systems.

(d) Irrigation: - No proposed irrigation projects are included in the plans for the comprehensive development of the Basin.

(e) Water Power: - With the exception of Wallenpaupack Creek, hydro-electric power has not been developed to any extent in the Delaware Basin in Pennsylvania. Due to the location of the anthracite coal fields in the central part of the Basin, hydro-electric developments have not been attractive to private capital.

The cost of steam generated power is expected to rise with the diminishing of the minable coal reserves, so that, in the future, hydro-electric power will probably become an important factor in the industrial development of the Basin. Since the number of reservoir sites is limited, it is desirable that a sufficient number of them be reserved for future development in order that they may be made available for hydro-power generation when needed.

No hydro-electric projects are recommended for immediate construction. The Corps of Engineers has outlined three projects for the development of power generation on the Delaware River. Their plan for the development of eight reservoirs with an installed capacity of 326,000 kilowatts appears to be the most favorable and though it is now not economically justified, it is listed for future development.

The development of the Lehigh River at Tobyhanna for power generation should await the development of the market for power in that area. The construction of a dam and reservoir at Tobyhanna for stream regulation, with provisions for hydro-electric installation, is recommended as a future project.

(f) Drainage: - No drainage projects are recommended for immediate or future construction.

(g) Recreation and Wild Life: - In the lower portion of the Basin, recreational facilities are entirely inadequate, while in the upper portion there is an abundance of land suitable for such purposes. The vast recreational area of the Poconos and Delaware Water Gap are too far distant to be enjoyed regularly by the concentrated population of the Philadelphia metropolitan area which suffers from the high temperature and excessive humidity during the summer months.

The construction of an adequate system of parks and parkways similar to that proposed in the Regional Plan of the Philadelphia Tri-State District would provide much needed recreational areas for the population of the Philadelphia Region. The great recreational potentialities of the main river - for fishing, boating, and bathing, are still largely undeveloped.

The provision of recreational areas along the smaller tributary streams adjacent to the Philadelphia metropolitan area would afford necessary recreational facilities for the residents of the Lower Basin who are unable to take advantage of the more distant facilities of the Upper Basin. The watersheds of these smaller tributaries, however, should not be utilized for intensive recreational purposes if they are to be used for municipal water supply purposes. However, sites for additional recreational

areas, accessible to the inhabitants of the Philadelphia metropolitan area, will become available if the municipal water supply for the Philadelphia metropolitan area is drawn from the Upper Delaware. Although it is possible to develop vast recreational areas in the upper portion of the Basin, these areas are now and probably will always remain relatively inaccessible to the majority of metropolitan residents for extensive use and enjoyment.

It is recommended that the present program of the Department of Forests and Waters and Game Commission for the acquisition of land for reforestration and recreational use be carried on without interruption.

(h) Rectification of Existing and Prevention of Future Contamination: - The pollution of the Delaware and Schuylkill Rivers is a major problem of the Basin. Untreated sewage is discharged into the streams by most of the municipalities. Trade wastes, and, in particular, culm and acid mine drainage, contribute to the pollution of the stream. The Philadelphia metropolitan area at the lower end of this Basin receives the full effect of this pollution. Below Trenton, N. J., the tidal effect of the River acts as a barrier to natural cleansing processes in that polluted water is pushed up stream during flood tides with the effect of slowing its progress to the sea. During times of minimum flow especially, the tidal basin becomes excessively polluted.

It is recommended that sewage treatment plants be constructed by the offending communities as soon as possible, and that wherever possible industries be required to treat their wastes.

Prior to the intensive industrial development of the Basin, the diluting property of the streams and the natural purification processes were sufficient to take care of sewage and trade wastes without considerable

nuisance or hazard. Communities and industries were permitted to use the waters from the streams with little or no restriction. Sewage outfalls were located at the down stream limits of communities, and water for municipal supply was taken at or above the up-stream limits. As the industrial development of the Basin progressed, however, and as the density of population increased, a point was long since reached where the amount of polluting matter discharged into the streams was too great for correction by natural purification processes, with the result that many of the Basin's waters are now greatly polluted.

The residents of communities, which discharge their sewage below the community limits, are naturally opposed to the expenditure of funds for the construction of sewage disposal plants which will benefit all the communities on the stream below them but which will be of little or no benefit to the community for which the plant is proposed. Since sewage, not industrial waste, constitutes the major portion of pollution, industries are reluctant to install treatment facilities for their waste products and oppose any plans which would compel them to do so. Such attitudes are understandable. Never the less, it must be recognized as being important to the general public welfare, that the right to use water from the streams of the Basin should include the responsibility of returning it to the streams in a reasonably unpolluted and usable condition.

The Sanitary Water Board administers the laws dealing with the pollution of the waters of the State, 82/ which includes those sections of the Purity of Waters Act of 1905 dealing with the discharge of sewage;

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82/ The LaRue stream pollution act (No. 394) passed by the Legislature during the 1937 session materially strengthens prior legislation. This act prohibits any pollution of waters in the State by sanitary or industrial waste and provides for severe penalties for non-compliance. It will be administered by the Sanitary Water Board.

section 200 of the Fish Laws of 1925 dealing with the discharge to State waters of substances harmful to fish and acquatic life; and those sections of the Rules and Regulations dealing with the discharge of organic wastes to State waters. Permits for the construction of sewers and sewage disposal plants are likewise issued by this Board.

This Board has long campaigned for the abatement of pollution, but has lacked strong supporting legislation. Dealing with trade wastes, it has worked largely on a cooperative basis, with considerable success.

The strict enforcement of the provisions of all laws (including the 1937 stream pollution Act # 394) relative to pollution, would eliminate most pollution originating within the State. In administering them, however, the Sanitary Water Board is confronted with obvious difficulties in their immediate strict enforcement due to the time required and the difficulties encountered in financing and constructing the necessary treatment plants.

The advisability of controlling pollution by combining water-use permits with sewage and trade waste permits is one suggestion which might prove effective in operation. Such a plan might provide that no water be withdrawn from any stream or reservoir without a permit and that a fee be charged for all water used, dependent upon the amount of polluting matter added by the water user prior to its return to the stream. The fees collected might then be used for sewage treatment and other forms of pollution control and abatement.

Unfortunately water supply and sewage disposal are usually considered to be entirely separate functions of municipal government. However,

since pollution originates in water use, it appears logical that the cost of sewage treatment works be assessed against the water user. The inclusion of a charge for such treatment, in water bills, would go far in educating the public to the inter-relationship of water supply and sewage disposal and provide a fair apportionment of costs for sewage treatment works. It is believed that such a practice would reduce water waste and expedite the construction of sewage treatment plants by providing an additional method for financing them.

# IX PROJECT LIST

The projects listed are recommended for the comprehensive development of the Delaware Basin in Pennsylvania.

Information concerning these projects was obtained from various sources, including the Pennsylvania Department of Health, Sanitary Waters Board, Pennsylvania Department of Forests and Waters, Drainage Basin Consultants for the National Resources Committee, U. S. A. Corps of Engineers Reports, Philadelphia Tri-State District Report, Schuylkill Valley Association Report, National Inventory of Works Projects, and Public Works Administration.

In as much as the time allotted did not permit the reporting agencies to make detailed cost analysis for many of the projects submitted, the information has been treated as advance confidential data. For this reason the name of the reporting agency is not included in the project list.

All information is as of September, 1936.

## GROUP I - IMMEDIATE CONSTRUCTION

Projects which are ready for construction, and should be undertaken as soon as possible.

### POLLUTION ABATEMENT

1. Abington Township, Montgomery Co. - Pollution abatement. Pennypack, Tacony and Wissahicken Creeks. Construction of a sewer system, pumping stations and complete treatment plant. Estimated cost - $1,400,000.

2. Beaver Meadows, Pa. - Nuisance abatement. Lehigh River. Construction of a sanitary sewer system. Estimated cost - $46,000.

3. Birdsboro, Pa. - Pollution abatement. Schuylkill River. Construction of a sewer system and first stage sewage treatment plant. Estimated cost - $200,000.

4. Chester, Pa. - Pollution abatement. Delaware River and local creeks. Construction of first stage sewage treatment plant. Estimated cost - $600,000.

5. Delaware County and Montgomery County. - Pollution abatement. Delaware River and County creeks. Construction of sewers, force mains, pumping stations and sewage treatment plants for those communities operating under the Central Delaware County Sewer Authority and the Darby Creek Sewer Board. Communities served include Darby Township, Haverford Township (part), Lower Chichester Township, Ridley Township, Springfield Township, Tinicum Township, Upper Chichester Township, Upper Darby Township, Alden, Clifton Heights, Collingdale, Colwyn, Darby, East Landsdowne, Eddystone, Folcroft, Glenolden, Landsdowne, Marcus Hook, Milburne, Morton, Norwood, Parkside, Prospect Park, Ridley Park, Rutledge, Sharon Hill, Swarthmore, Trainer, Upland and Yeadon. Estimated cost - $6,000,000.

6. Hatfield, Pa. - Pollution abatement. Neshaminy Creek. Construction of a sewer system and complete treatment disposal plant. Estimated cost - $150,000.

7. Haverford & Radnor Townships. - Delaware County. - Pollution abatement. Darby Creek and Delaware River. Construction of a plant for the complete treatment of sewage. Esti-

mated cost - $328,000.

8. Lansdale, Pa. - Pollution abatement. Neshaminy Creek. Construction of additional sewers and repairs to existing sewers. Estimated cost - $100,000.

9. Philadelphia, Pa. - Pollution abatement. Delaware and Schuylkill Rivers and local creeks. Construction of interceptors and two first stage treatment plants and extension to existing disposal plant. Estimated cost - $25,000,000.

10. Rose Valley, Pa. - Pollution abatement. Ridley Creek. Construction of a complete treatment disposal plant. Estimated cost - $36,884.29.

11. Soudertown, Pa. - Pollution abatement. Perkiomen Creek. Construction of additional sewers and pumping station to serve a section of the town not now served. Estimated cost - $150,000.

12. Weatherly, Pa. - Nuisance abatement. Lehigh River. Extension of sewer systems. Estimated cost - $12,000.

MUNICIPAL WATER SUPPLY

13. Avondale, Pa. - Water Supply. Construction of a filtration plant. Estimated cost - $20,000.

14. Birdsboro, Pa. - Water Supply. Construction of filtration plant for Hay Run supply. Estimated cost - $20,000.

15. Bristol, Pa. - Municipal water supply. Construction of mixing basins, additional coagulating basin capacity, water tight cover for filtered water basin and miscellaneous changes to plant. Estimated cost - $100,000.

16. Coatesville, Pa. - Municipal water supply. Construct 1,000,000 gallon reservoir. Equip two new filter units; construct water main from filtration plant to city. Construct fence around impounding reservoir and make additions to distribution system. Estimated cost - $182,000.

17. Delaware Co. Prison, Pa. - Water supply. Obtain an additional source of supply and construct additional storage capacity. Estimated cost - $15,000.

18. Delaware Water Gap, Pa. - Water supply. Construct new intake and reconstruct storage reservoir. No cost estimate.

19. Doylestown, Pa. - Municipal water supply. Protect and improve existing water works. Estimated cost - $50,000.

20. East Greenville, Pa. - Municipal water supply. Construct additional filter capacity and a mixing basin, improve existing coagulating basin. Estimated cost - $30,000.

21. East Stroudsburg, Pa. - Water supply. Complete the construction of the storage reservoir now under construction. Estimated cost - $70,000.

22. Kennett Square, Pa. - Water supply. Completion of additional impounding reservoir. Estimated cost - $10,000.

23. Langhorne, Pa. - Water supply. Construction of a mixing basin and a filtered water basin; improvements to coagulating basin and wash water system. Estimated cost - $30,000.

24. Media, Pa. - Municipal water supply. Construction of a rapid sand filter plant. Estimated cost - $100,000.

25. Morrisville, Pa. - Municipal water supply. Construction of mixing basins and additional settling basin capacity; rearrange raw water and filtered water piping. Estimated cost - $60,000.

26. Perkasie, Pa. - Water supply. Construction of mixing basin and improvements to wash water system. Estimated cost - $5,000.

27. Philadelphia, Pa. - Water supply. Increase filter capacity and make repairs and extensions to existing system. Estimated cost - $3,130,000.

28. Philadelphia, Metropolitan Area. - Water supply study. Study of plans for future water supply for the Philadelphia Metropolitan Area. Estimated cost - $75,000.

29. Pottstown, Pa. - Water supply. Remove existing pipe lines in old sedimentation basin; improve wash water system. Estimated cost - $10,000.

30. Riegelsville, Pa. - Water supply. Improvements to storage reservoir, Estimated cost - $15,000.

31. Sellersville, Pa. - Water supply. Cleaning pipe line between filter plant and distribution reservoir. Estimated cost - $3,000.

32. Soudertown, Pa. - Municipal water supply. Install equipment for treating entire supply with chemical germicide. Study for determining improvements to insure an adequate and safe supply of water. Estimated cost - $5,000.

33. Springtown, Pa.- Water supply. Protect and improve existing works. Estimated cost - $1,000.

34. Topton, Pa. - Municipal water supply. Installation of chlorination apparatus. Estimated cost - $1,000.

35. Yardley, Pa. - Water supply. Secure auxiliary source of supply. Estimated cost - $2,000.

GROUP II DEFERRED CONSTRUCTION

Projects which, while desirable for immediate construction, (a) involve controversial questions, (b) can have their priority definitely determined only after additional studies which can not be completed in time for this report, or (c) are now obstructed by legal administrative or other difficulties.

POLLUTION ABATEMENT

36. Allentown, Pa. - Pollution abatement. Lehigh River. Construction of trunk sewers and extension of laterals. Estimated cost - $337,000.

37. Bangor, Pa. - Nuisance abatement. Lehigh River. Construction of a new sewer system. Estimated cost - $ 450,000.

38. Berks Co. Welfare Farm, Pa. - Pollution abatement. Schuylkill River. Construction of a sewage disposal plant. Estimated cost - $45,000.

39. Bethlehem, Pa. - Pollution abatement. Lehigh River. Construction of an adequate first stage sewage disposal plant. Estimated cost - $500,000.

40. Bethlehem, Pa. - Pollution abatement. Lehigh River. Construction of trunk sewers, sewage pumping station, sewer siphon and additional sanitary sewers. Estimated cost - $885,000.

41. Bowmanstown, Pa. - Pollution abatement. Lehigh River. Construction of a sewage disposal plant. Estimated cost - $60,000.

42. Conshohocken, Pa. - Pollution abatement. Schuylkill River. Construction of a sewer system and a first stage treatment plant. Estimated cost - $803,636.

43. Downingtown, Pa. - Pollution abatement. Brandywine Creek. Construction of additional units for enlarging the present complete treatment sewage disposal plant. Estimated cost - $80,000.

44. Easton, Pa. - Pollution abatement. Delaware River. Completion of sewer system. Estimated cost - $1,250,000.

45. Hazleton, Pa. - Nuisance abatement. Lehigh River. Sewer extensions and improvements. Estimated cost - $33,000.

46. Morrisville, Pa. - Pollution abatement. Delaware River. Construction of a sewer system and first stage treatment plant. Estimated cost - $375,000.

47. Mt. Penn, Pa. - Nuisance abatement. Construction of a sanitary sewer system. Estimated cost - $325,000.

48. Palo Alto, Pa. - Nuisance abatement. Schuylkill River. Construction of new sanitary sewers and extension of existing sewers. Estimated cost - $50,000.

49. Phoenixville, Pa. - Pollution abatement. Schuylkill River. Construction of a sewer system and first stage treatment plant. Estimated cost - $750,000.

50. Reading, Pa. - Pollution abatement. Schuylkill River. Construction of settling tanks and filter beds at the present sewage disposal plant. Estimated cost - $125,000.

51. Reading, Pa. - Pollution abatement. Schuylkill River. Construction of additional sewers. Estimated cost - $650,000.

52. Slatington, Pa. - Nuisance abatement. Lehigh River. Extension to sewers and change of creek bed. Estimated cost - $41,500.

53. Spring City, Pa. - Pollution abatement. Schuylkill River. Construction of a sewer system and a complete treatment sewage disposal plant. Estimated cost - $205,454.

54. Summit Hill, Pa. - Nuisance abatement. Lehigh River. Construction of additional sanitary sewers. Estimated cost - $16,500.

55. Waymart, Pa. - Pollution abatement. Lackawaxen River. Construction of a sewage disposal plant. Estimated cost - $18,000.

56. Wilson Borough, Pa. - Pollution abatement. Delaware River. Construction of a sewer system. Estimated cost - $500,000.

MUNICIPAL WATER SUPPLY

57. Alburtis, Pa. - Water supply. Extension of water mains. No cost estimate.

58. Allentown, Pa. - Municipal water supply. Construct a distributing reservoir and flood protection works at pumping station; reinforce distribution system. Estimated cost - $1,500,000.

59. Bethlehem, Pa. - Municipal water supply. Construction of reservoir, raw water reservoir wall, mixing chamber and water mains; addition to filtration plant; improvements to sedimentation tank and water-works building; construction of laboratory building. Estimated cost - $723,492.

60. Bowmanstown, Pa. - Municipal water supply. Extension of water mains. Estimated cost - $7,000.

61. Bushkill, Pa. - Water supply. Rehabilitate Thompson spring and continue permanent pipe line from that spring to the village. No cost estimate.

62. Canadensis, Pa. - Water supply. Rehabilitate spring source of supply. No cost estimate.

63. Coopersburg, Pa. - Municipal water supply. Wawbeck reservoir and construction of 3 miles of 6" water line. No complete cost estimate available.

64. Delaware Co. Home, Pa. - Water supply. Obtain additional source of supply and construct a storage reservoir. Estimated cost - $10,000.

65. Dingmans Ferry, Pa. - Water supply. Construct storage reservoir. No cost estimate.

66. Downingtown, Pa. - Water supply. Construction of water lines to connect dead ends of distribution system. Estimated cost - $5,000.

67. Fleetwood, Pa. - Municipal water supply. Construct storage reservoir and $1\frac{1}{2}$ miles of 12" water line. No cost estimate available.

68. Hamburg, Pa. - Municipal water supply. Study project for impounding dam. Estimated cost - $4,000.

69. Hawley, Pa. - Water supply. Develop additional source of supply. No cost estimate.

70. Hulmeville, Pa. - Water supply. Extension of water mains. Estimated cost - $2,000.

71. Lynn Township, Lehigh Co., Pa. - Water supply for fire protection.

Construction of dams and reservoirs at New Tripoli and Wanamakers. Estimated cost - $15,000.

72. Neshaminy, Pa.- Water supply. Installation of auxiliary power equipment to operate low duty pumps during power failure. No cost estimate.

73. Orwigsburg, Pa. - Municipal water supply. Construction of catch basin for reservoir and additional water lines. Estimated cost $6,085.

74. Parksburg, Pa. - Water supply. Protect and improve existing works. Estimated cost - $3,000.

75. Parryville, Pa. - Water supply for fire protection. Construction of a water supply system for fire protection. Estimated cost - $35,000.

76. Pennypack Creek, Lower Moreland Township, Montgomery Co., Pa. - Water supply. Wash water improvements; renewal or repair of loss of head gauges and rate controllers; elimination of filtered water from pipe gallery. No cost estimate.

77. Phoenixville, Pa. - Municipal water supply. Construct mixing basin, additional coagulating and settling basin capacity, improve existing coagulating basin and extend water lines. Estimated cost - $60,000.

78. Royersford, Pa. - Water supply. Construction of mixing basins. Estimated cost - $8,000.

79. Schuylkill Haven, Pa.- Municipal water supply. Extension of water lines. Estimated cost - $4,585.

80. Schwenkville, Pa. - Water supply. Overhaul auxiliary well. Estimated cost - $800.

81. Scot Run, Pa. - Water supply. Install a more efficient type of chlorination apparatus. Estimated cost - $1,000.

82. Slatington, Pa. - Municipal water supply. Construction of a 1,000,000 gallon storage reservoir and water mains. Estimated cost - $61,900.

83. Topton, Pa. - Water supply for fire protection. Construction of a reservoir and pipe line. Estimated cost - $10,000.

84. Trumbauersville, Pa. - Water supply for fire protection. Estimated cost - $35,000.

85. Upper Salford Township, Montgomery Co., Pa. - Water supply. Extension of main from water basin through Salfordville. Estimated cost - $1,800.

86. Walnutport, Pa. - Water supply. Concreting present storage reservoir. Estimated cost - $15,000.

87. West Chester, Pa. - Water supply. Repairs to water system; extension of water mains; new fire hydrants and new fence for protecting reservoir. Estimated cost - $3,100.

88. West Chester Gardens - Water supply. Installation of chlorination apparatus for existing supply. Estimated cost - $1,500.

FLOOD CONTROL

89. Frankford Arsenal, Philadelphia, Pa. - Flood protection. Raise height of sea wall. Estimated cost - $100,000.

90. Schuylkill River, Pa. - Flood control. Removal of channel encroachments, construction of dams, and stabilization of culm banks. Estimated cost - $10,920,000. Estimate

subject to revision upon completion of survey now being made by the Corps of Engineers, U. S. Army.

91. Tobyhanna Reservoir. - Flood control. Construction of a dam on the Lehigh River below the confluence of the Tobyhanna River. Reservoir would aid in low flow control and could be used in connection with a power or water supply project. Estimated cost - $3,030,000.

STREAM CONTROL

92. Tocks Island, Pa. and N. J. - River regulation. Delaware River. Construction of a dam at Tocks Island. Estimated cost - $15,260,000. This reservoir will increase low water flows of the Delaware and be of great benefit for pollution control during the critical months. It will afford a measure of flood control and retard the invasion of salinity above the Delaware - Pennsylvania line. The dam may be utilized for the production of power and for a source of water supply for metropolitan Philadelphia.

POWER

93. Delaware River. - Power. Construction of dams and power houses at Cannonsville, Cochecton, Narrowsburg, Barryville, Mongaup, Belvidere and Chestnut Hill. These reservoirs would aid in low flow control, flood control and water supply. Estimated cost - $24,837,400.

## GROUP III INDETERMINATE CONSTRUCTION

Projects whose specific priority in the program is as yet indeterminate.

### MUNICIPAL WATER SUPPLY

94. Bechtelsville, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

95. Bernville, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

96. Centreport, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

97. Fritztown, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

98. Lenhartsville, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

99. Mohrsville, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

100. Oley, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

101. Shartlesville, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

102. Stouchburg, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

103. Strausstown, Berks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

104. Dublin, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

105. Ivyland, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

106. New Britain, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

107. New Hope, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

108. Richlandtown, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

109. Silverdale, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

110. Trumbauersville, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

111. Tullytown, Bucks Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

112. East Side, Carbon Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

113. Modena, Chester Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

114. Fogelsville, Lehigh Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

115. New Tripoli, Lehigh Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

116. Broadheadsville, Monroe Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

117. Kresgeville, Monroe Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

118. Collegeville, Montgomery Co. - Water Supply. Construction of a public water sypply system. No cost estimate available.

119. Green Lane, Montgomery Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

120. Trappe, Montgomery Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

121. Chapman, Northampton Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

122. Klecknersville, Northampton Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

123. Lackawaxen, Pike Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

124. New Ringgold, Schuylkill Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

125. Ariel, Wayne Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

126. Prompton, Wayne Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

127. White Mills, Wayne Co. - Water Supply. Construction of a public water supply system. No cost estimate available.

# APPENDICES

Appendix A

Water Supply Systems — Delaware Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served. by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | | | | |
| Chester | Delaware | 55,105 | River | 68,000 (F) | | |
| Cities & Boro's 25,000 to 50,000 | | | | | | |
| None | | | | | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | |
| Bristol | Bucks | 11,500 | River | 9,500 (F) | Mixing Basin & Impr. to system | Order Issued |
| Coatesville | Chester | 14,586 | Creek | 19,000 (F) | Add. Reservoir & Impr. to system | Order Issued |
| West Chester | Chester | 12,413 | Creek | 12,500 (F) | Improvements to system | Bldg. W.P.A. |
| Darby | Delaware | 11,663 | Phila. Suburban | X (F) | | |
| Landsdowne | Delaware | 10,463 | Phila. Suburban | X (F) | | |
| Boro's 5,000 to 10,000 | | | | | | |
| Morrisville | Bucks | 5,552 | River | 6,068 (F) | Impr. & additions to system | Order Issued |
| Quakertown | Bucks | 5,010 | Well | 5,000 (C) | | |

Type of treatment: - (C) -Chlorination
(F) -Filtered
(U) -Untreated

(1916)Data from Water Resources Inventory Report 1916.

(1931)Data from "Groundwater in S.E. Penna."

X - Population served not separated for community.

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 5,000 to 10,000 | | | | | | |
| Clifton Heights | Delaware | 4,554 | Phila. Suburban | X (F) | | |
| Collingdale | Delaware | 7,711 | Phila. Suburban | X (F) | | |
| Media | Delaware | 5,090 | Creek | 5,000 (F) | New Rapid Sand Filter Plant | Order Issued |
| Yeadon | Delaware | 6,729 | Phila. Sub'rn | X (F) | | |
| East Stroudsburg | Monroe | 5,861 | Spring & Creek | 6,300 (C) | Storage Reservoir | Under Constr. |
| Stroudsburg | Monroe | 6,131 | Creek | 7,000 (C) | | |
| Bangor | Northampton | 5,745 | Spring, Well & Creek | 10,800 (C) | | |
| Nazareth | Northampton | 5,480 | Creek | 11,000 (C) | | |
| Honesdale | Wayne | 5,666 | Lake | 7,000 (C) | | |
| Boro's 2,500 to 5,000 | | | | | | |
| Doylestown | Bucks | 4,518 | Spring & Well | 4,400 (C) | Improvements to system | Order Issued |
| Downingtown | Chester | 4,260 | Creek | 5,000 (F) | Connection for dead ends of distribution system | |
| Kennett Square | Chester | 3,259 | Creek | 2,850 (F) | Completion of impounding Reservoir | Order Issued |
| Aldan | Delaware | 3,252 | Phila. Suburban | X (F) | | |
| East Landsdowne | Delaware | 3,057 | Phila. Suburban | X (F) | | |
| Glen Olden | Delaware | 4,602 | Phila. Suburban | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 2,500 to 5,000 | | | | | | |
| Marcus Hook | Delaware | 4,679 | Chester | X (F) | | |
| Norwood | Delaware | 3,806 | Phila. Suburban | X (F) | | |
| Prospect Park | Delaware | 4,642 | Phila. Suburban | X (F) | | |
| Ridley Park | Delaware | 3,480 | Phila. Suburban | X (F) | | |
| Sharon Hill | Delaware | 4,773 | Phila. Suburban | X (F) | | |
| Swarthmore | Delaware | 4,063 | Creek | 500 (F) | | |
| Upland | Delaware | 2,845 | Chester | X (F) | | |
| Wayne P.O. (Radnor Twp) | Delaware | 3,000 | | | | |
| Hatboro | Montgomery | 3,214 | Well | 3,500 (C) | | |
| Penn Argyle | Northampton | 4,098 | Nazareth (1916) | X (C) | | |
| Boro's 2,500 and Less | | | | | | |
| Chalfonte | Bucks | 623 | Well | 550 (C) | | |
| Dublin | Bucks | 623 | | | Public Supply | |
| Hulmeville | Bucks | 588 | Langhorne | X (F) | Extension of Water Mains | |
| Ivyland | Bucks | 321 | | | Public Supply | |
| Langhorne | Bucks | 1,452 | Creek & Well | 3,100 (F) | Additions & Impr. to system | Order Issued |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | |
| Langhorne Manor | Bucks | 207 | Langhorne | X (F) | | |
| New Britain | Bucks | 513 | | | Public Supply | |
| New Hope | Bucks | 1,119 | | | Public Supply | |
| Newton | Bucks | 2,012 | | X (1916) (U) | | |
| Richlandtown | Bucks | 693 | | | Public Supply | Plans Approved |
| Riegelsville | Bucks | 830 | Spring | 107 (C) | Impr. to Storage Reservoir | Order Issued |
| South Langhorne | Bucks | 823 | Langhorne | X (F) | | |
| Trumbauersville | Bucks | 629 | | | Public Supply | |
| Tullytown | Bucks | 774 | | | Public Supply | |
| Yardley | Bucks | 1,510 | Well | 1,300 (C) | Auxiliary Supply | Order Issued |
| Avondale | Chester | 898 | Spring | 760 (C) | Filtration Plant | Order Issued |
| Honey Brook | Chester | 662 | | X (1931) (U) | | |
| Malvern | Chester | 1,601 | Well & Spring | 1,286 (C) | | |
| Parkesburg | Chester | 2,339 | Well, Spring & Creek | 2,400 (C) | Improvements to Plant | |
| South Coatesville | " | 1,495 | Coatesville | X (F) | | |
| West Grove | " | 1,352 | | | | |
| Colwyn | Delaware | 1,738 | Phila. Suburban | X (F) | | |
| Eddystone | Delaware | 2,379 | Phila. Suburban | X (F) | | |
| Folcroft | Delaware | 1,688 | Phila. Suburban | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | |
| Millbourne | Delaware | 438 | Phila. Suburban | X (F) | | |
| Morton | Delaware | 1,261 | Phila. Suburban | X (F) | | |
| Parkside | Delaware | 1,585 | Chester | X (F) | | |
| Rose Valley | Delaware | 53 | Media | X (F) | | |
| Rutledge | Delaware | 858 | Phila. Suburban | X (F) | | |
| Trainer | Delaware | 1,626 | Chester | X (F) | | |
| Delaware Water Gap | Monroe | 443 | Creek | 2,000 (C) | New Intake & Improvements to Reservoir | Permit 10-15-26 |
| Mt. Pocono | Monroe | 613 | | X (1931) (U) | | |
| Bryn Athyn | Montgomery | 1,365 | Phila. Suburban | X (F) | | |
| Hatfield | Montgomery | 1,216 | Well | 1,000 (C) | | |
| East Bangor | Northampton | 843 | | X (1916) (U) | | |
| Portland | Northampton | 490 | Creek | 1,000 (C) | | |
| Roseto | Northampton | 1,791 | Bangor | X (C) | | |
| Stockertown | Northampton | 650 | | | | |
| Tatamy | Northampton | 561 | | | | |
| Wind Gap | Northampton | 1,352 | Nazareth | X (C) | | |
| Matamoras | Pike | 1,948 | | X (1931) (U) | | |
| Milford | Pike | 259 | | X (1931) (U) | | |
| Bethany | Wayne | 154 | | | | |

Water Supply Systems — Delaware Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | |
| Hawley | Wayne | 2,049 | Creek | 1,900 (C) | Additional Source of Supply | |
| Prompton | Wayne | 195 | | | Public Supply | |
| Waymart | Wayne | 1,022 | | 700 (C) | | |
| UNINCORPORATED TOWNS AND VILLAGES | | | | | | |
| Andalusia | Bucks | 1,200 | | | | |
| Edgely | Bucks | 1,200 | | | | |
| Eddington | Bucks | 1,000 | | | | |
| Fallsington | Bucks | 600 | | | | |
| Foundrytown | Bucks | 2,800 | | | | |
| Line Lexington | Bucks | 519 | | | | |
| Neshaminy Falls | " | 500 | | | | |
| Oakford | " | 500 | | | | |
| Parkland | " | 500 | | | | |
| Penns Park | " | 1,000 | | | | |
| Plumsteadville | " | 750 | | | | |
| East Nantmeal | Chester | 594 | | | | |
| Lewisville | Chester | 514 | | | | |
| Marshallton | Chester | 528 | | | | |
| Paoli | Chester | 3,500 | Phila. Suburban | X (F) | | |
| Pomeroy | Chester | 600 | | | | |
| Thorndale | Chester | 500 | | | | |
| Bromall | Delaware | 1,200 | Phila. Suburban | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| UNINCORPORATED TOWNS AND VILLAGES | | | | | | |
| Glen Riddle | Delaware | 1,500 | Well & Spring | 50 (C) | | |
| Lenni | Delaware | 500 | | | | |
| Lima | Delaware | 500 | | | | |
| Linwood | Delaware | 4,000 | | | | |
| Moylan | Delaware | 1,000 | Media | X (F) | | |
| South Media | Delaware | 600 | Media | X (F) | | |
| Buck Hill Falls | Monroe | 1,500 | Creek | 1,000 (C) | | |
| Skytop | Monroe | 600 | Spring & Creek | 400 (C) | | |
| Haverford | Montgomery | 4,000 | Phila. Suburban | X (F) | | |
| Horsham | Montgomery | 1,200 | | | | |
| Huntingdon Val'y | " | 500 | Phila. Suburban | X (F) | | |
| Meadow Brook | " | 800 | | | | |
| Willow Grove | " | 3,000 | Phila. Suburban | X (F) | | |
| Martins Creek | Northampton | 1,042 | | | | |
| Paxinosa | Northampton | 500 | | | | |
| Lackawaxen | Pike | 500 | | | | |
| Newfoundland | Wayne | 500 | | | | |
| White Mills | Wayne | 650 | Honesdale | X (C) | Public Supply | |

Water Supply Systems

Delaware Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| FIRST CLASS TOWN-SHIPS | | | | | | |
| Nether Providence | Delaware | 3,050 | Chester | X (F) | | |
| Radnor | Delaware | 12,647 | Phila. Suburban | X (F) | | |
| Ridley | Delaware | 8,872 | Phila. Suburban | X (F) | | |
| Springfield | Delaware | 4,719 | Creek | 155,000 (F) | | |
| Upper Darby | Delaware | 56,861 | Phila. Suburban | X (F) | | |

Water Supply Systems — Lehigh Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| CITIES 50,000 to 100,000 | | | | | | |
| Allentown | Lehigh | 93,915 | Creek & Spring | 92,000 (C)<br>90,000 (F) | Distribution Reservoir & Improvements to System | Bldg. P.W.A. |
| Bethlehem | Northampton | 57,379 | Well, Spring & River | 11,300 (C)<br>36,000 (F) | Reservoir Mixing Basin & Additions & Impr. to Plant | |
| CITIES 25,000 to 50,000 | | | | | | |
| Hazleton | Luzerne | 35,745 | Well & Creek | 57,000 (C) | | |
| Easton | Northampton | 32,679 | Well, Spring & River | 20,000 (C)<br>40,000 (F) | | 2 Plants |
| CITIES 10,000 to 25,000 | | | | | | |
| None | | | | | | |
| BORO'S 5,000 to 10,000 | | | | | | |
| Lansford | Carbon | 9,242 | Creek & Well | 196,000 (C) | | |
| Lehighton | Carbon | 6,641 | Creek | 8,300 (C) | | |
| Palmerton | Carbon | 7,435 | Well | 8,000 (C) | | |
| Summit Hill | Carbon | 5,536 | Well & Spring | 5,600 (C) | | |
| Emaus | Lehigh | 6,410 | Well & Spring | 6,500 (C) | | |
| Freeland | Luzerne | 7,182 | Well | 7,000 (C) | | |
| Northampton | Northampton | 9,748 | Creek & River | 20,000 (F) | | |
| Wilson | Northampton | 8,185 | Easton | X (F) | | |
| Coaldale | Schuylkill | 6,706 | Lansford (1916) | X (F) | | |

Type of treatment: - (C)- Chlorination
(F)- Filtered
(U)- Untreated

(1916) Data from Water Resources Inventory Report 1916.
X - Population served not seperated for community.

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| BORO'S 2,500 to 5,000 | | | | | | |
| East Mauch Chunk | Carbon | 3,687 | Creek & Well | 3,800 (C) | | |
| Mauch Chunk | Carbon | 2,975 | Creek, Well & Spring | 2,000 (C) | | |
| Weatherly | Carbon | 2,531 | Creek | 2,600 (C) | | |
| Catasauqua | Lehigh | 4,521 | Northampton | X (F) | | |
| Coplay | Lehigh | 3,171 | Northampton | X (F) | | |
| Fountain Hill | Lehigh | 4,692 | Bethlehem | X (F) | | |
| Slatington | Lehigh | 4,826 | Creek & Spring | 4,200 (C) | | |
| Hellertown | Northampton | 3,913 | | X (1916) (U) | | |
| BORO'S 2,500 - Less | | | | | | |
| Beaver Meadows | Carbon | 2,086 | Hazleton (1916) | X (C) | | |
| Bowmanstown | Carbon | 843 | Spring | 850 (C) | Extension to water mains | |
| East Side | Carbon | 206 | | | Public Supply | |
| Parryville | Carbon | 627 | | | | |
| Weissport | Carbon | 710 | Leighton (1916) | X (C) | | |
| Alburtis | Lehigh | 883 | | | Extension to water mains | |
| Coopersburg | Lehigh | 1,072 | Well | X (U) | Reservoir and new water lines | |
| Macungie | Lehigh | 801 | | X (1916) (U) | | |
| Bath | Northampton | 1,730 | Spring & Well | 1,600 (C) | | |
| Chapman | Northampton | 234 | | | Public Supply | |
| Freemansburg | Northampton | 1,475 | | | | |
| Glendon | Northampton | 590 | | | | |
| North Catasauqua | Northampton | 2,410 | Northampton (1916) | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| BORO'S 2,500 - Less | | | | | | |
| Walnutport | Northampton | 1,191 | Spring & Well | 1,200 (C) | | |
| West Easton | Northampton | 1,516 | Easton | X (F) | | |
| UNINCORPORATED TOWNS & VILLAGES | | | | | | |
| Topton | Berks | 1,721 | Well | X (U) | Chlorination Apparatus | Order Issued |
| Junedale | Carbon | 595 | | | | |
| Lewistown | Carbon | 595 | | | | |
| Nesquehoning | Carbon | 4,176 | Lansford | X (C) | | |
| New Columbus | Carbon | 1,750 | | | | |
| Packerton | Carbon | 590 | | | | |
| Tresckow | Carbon | 1,856 | McAdoo | X (C) | | |
| Albrights | Lehigh | 500 | | | | |
| Cementon | Lehigh | 2,030 | Northampton | X (F) | | |
| Center Valley | Lehigh | 700 | | | | |
| Egypt | Lehigh | 1,489 | Northampton | X (F) | | |
| Fogelsville | Lehigh | 513 | | | Public Supply | |
| Fullerton | Lehigh | 3,075 | Northampton | X (F) | | |
| Gauffs Hill | Lehigh | 650 | | | | |
| Hokendauqua | Lehigh | 1,298 | Northampton | X (F) | | |
| Slatedale | Lehigh | 640 | Creek | 1,200 (C) | | |
| South Allentown | Lehigh | 2,549 | | | | |
| Stiles | Lehigh | 721 | | | | |
| West Catasauqua | Lehigh | 1,500 | Northampton | X (F) | | |
| Cranberry Jct. | Luzerne | 600 | Hazleton | X (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| UNINCORPORATED TOWNS & VILLAGES 450 or Over | | | | | | |
| Drifton | Luzerne | 1,400 | Hazleton | X (C) | | |
| Eckley | Luzerne | 825 | Hazleton | X (C) | | |
| Jeanesville | Luzerne | 500 | Hazleton | X (C) | | |
| Stockton | Luzerne | 742 | Hazleton | X (C) | | |
| Danielsville | Northampton | 1,184 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| CITIES 100,000 or over | | | | | | |
| Reading | Berks | 108,445 | Creek & *Well | 2,000 (C)*<br>122,100 (F) | Completion of additional Filter Plant | 5-(F) Plant<br>* 1-(C) Plant |
| Philadelphia | Phila. | 1,868,060 | Rivers & *Well | 60 (C)*<br>2,016,500 (F) | Increased Filter Capacity; Repairs & Extension to Present System | *1-(C) Plant<br>4-(F) Plant |
| CITIES 25,000 to 50,000 | | | | | | |
| Norristown | Montgomery | 36,163 | River | 50,000 (F) | | |
| Pottsville | Schuylkill | 26,114 | Creek | 35,000 (C) | | |
| CITIES 10,000 to 25,000 | | | | | | |
| Phoenixville | Chester | 11,871 | River | 13,000 (C) | Additions & Improvements | |
| Conshohocken | Montgomery | 10,762 | Philadelphia | X (F) | | |
| Pottstown | Montgomery | 20,617 | River | 23,000 (C) | Improvements to System | Order Issued |
| Tamaqua | Schuylkill | 12,864 | Creek & Well | 13,000 (C) | | |

Type of treatment: - (C) -Chlorination
(F) -Filtered
(U) -Untreated

(1916) Data from Water Resources Inventory Report 1916.
X - Population served not seperated for community.

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| BOROUGHS 5,000 to 10,000 | | | | | | |
| West Reading | Berks | 5,263 | Creek | | | |
| Bridgeport | Montgomery | 5,780 | Norristown | X (F) | | |
| Lansdale | Montgomery | 8,950 | Well | 8,400 (C) | | |
| Minersville | Schuylkill | 9,029 | Creek | 9,400 (C) | | |
| Schuylkill Haven | Schuylkill | 6,899 | Creek | 6,500 (C) | | |
| Saint Clair | Schuylkill | 6,864 | Pottsville (1916) | X (C) | | |
| BORO'S 2,500 to 5,000 | | | | | | |
| Birdsboro | Berks | 3,516 | Creek | 3,550 (C) | Filtration for Hay Run Supply | Order Issued |
| Boyertown | Berks | 4,152 | Creek, Well & Spring | 4,000 (F) | | |
| Hamburg | Berks | 3,873 | Creek & Well | 3,600(C)700(F) | | |
| Kutztown | Berks | 2,827 | Well | 2,800 (C) | | |
| Laureldale | Berks | 3,209 | | | | |
| Mount Penn | Berks | 3,141 | Creek, Well & Spring | 7,500 (C) | | |
| Shillington | Berks | 4,890 | Mohnton(1916) | X (C) | | |
| Wyomissing | Berks | 3,309 | Well | | | |
| Perkasie | Bucks | 3,309 | Creek | 1,500 (F) | Mixing Basin & Improvements | |
| Spring City | Chester | 3,010 | Royersford | X (F) | | |
| Myerstown | Lebanon | 2,580 | Spring | 2,590 (C) | | |
| Ambler | Montgomery | 4,327 | Spring | 5,000 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| BORO'S 2,500 to 5,000 | | | | | | |
| Jenkintown | Montgomery | 4,923 | Creek | 4,500 (F) | | |
| Narbeth | Montgomery | 4,818 | Phila. Surb. | X (F) | | |
| North Wales | Montgomery | 2,535 | Well | 2,500 (C) | | |
| Royersford | Montgomery | 3,981 | River | 6,000 (F) | Mixing Basin | Order Issued |
| Souderton | Montgomery | 3,808 | Well | 3,850 (C) | Improved Chemical Treatment | Order Issued |
| West Conshohocken | Montgomery | 2,548 | Phila. Surb. | X (F) | | |
| New Philadelphia | Schuylkill | 2,714 | Creek | 3,200 (C) | | |
| Port Carbon | Schuylkill | 3,402 | Pottsville (1916) | X (C) | | |
| BORO'S 2,500 & Less | | | | | | |
| Bally | Berks | 532 | | | | |
| Bechtelsville | Berks | 595 | | | Public Supply | |
| Bernville | Berks | 349 | | | Public Supply | |
| Centerport | Berks | 148 | | | Public Supply | |
| Fleetwood | Berks | 2,093 | Spring & Well | 2,150 (C) | | |
| Kenhorst | Berks | 1,600 | | | | |
| Lyons | Berks | 511 | | | | |
| Lenhartsville | Berks | 182 | | | Public Supply | |
| Mohnton | Berks | 1,973 | Creek | 6,000 (C) | | |
| Robesonia | Berks | 1,574 | | | | |
| Shoemakersville | " | 956 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| BORO'S 2,500 & Less | | | | | | |
| Sinking Spring | Berks | 2,259 | Spring & Well | 5,800 (C) | | |
| Saint Lawrence | Berks | 815 | Womelsdorf | X (C) | | |
| Strausstown | Berks | 366 | | | Public Supply | |
| Temple | Berks | 1,626 | | | | |
| Wernersville | Berks | 1,110 | Well & *Creek | 300 (C)<br>*1,000 (F) | | |
| West Lawn | Berks | 2,278 | Sinking Springs | X (C) | | |
| West Leesport | Berks | 449 | | | | |
| Womelsdorf | Berks | 1,392 | Spring & Well | 3,000 (C) | | |
| Wyomissing Hills | " | 486 | | | | |
| Sellersville | Bucks | 2,016 | Spring & Creek | 2,200 (C) | Improvements | Order Issued |
| Silverdale | Bucks | 294 | | | Public Supply | |
| Telford | Bucks | 423 | Well | 1,700 (C) | Additions to Plant | Bldg. P.W.A. |
| Richland | Lebanon | 1,014 | | X(1916) (U) | | |
| Collegeville | Montgomery | 903 | | | Public Supply | Bldg. P.W.A. |
| East Greenville | Montgomery | 1,746 | Creek | 1,500 (F) | Additional Filter Capacity & Improvements | Order Issued<br>Bldg. P.W.A. |
| Green Lane | Montgomery | 426 | | | Public Supply | |
| Pennsburg | Montgomery | 1,413 | Creek | 1,800 (C) | | |
| Red Hill | Montgomery | 800 | | X(1916) (U) | | |
| Rockledge | Montgomery | 1,981 | Phila. Surb. | X (F) | | |
| Schwenkville | Montgomery | 470 | | X(1916) (U) | Overhaul Auxiliary Well | |
| Trappe | Montgomery | 437 | | | Public Supply | Bldg. P.W.A. |
| West Telford | Montgomery | 1,298 | Telford | X (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| BORO'S 2,500 & Less | | | | | | |
| Auburn | Schuylkill | 1,154 | | X (U) | | |
| Cressona | Schuylkill | 1,970 | Schuylkill Haven | X (C) | | |
| Landingville | Schuylkill | 253 | | | | |
| Mechanicsville | Schuylkill | 764 | | | | |
| Mount Carbon | Schuylkill | 323 | | | | |
| New Ringgold | Schuylkill | 499 | | | Public Supply | |
| Orwigsburg | Schuylkill | 2,177 | Creek & Well | 2,000 (C) | | |
| Palo Alto | Schuylkill | 1,946 | Pottsville | X (C) | | |
| Port Clinton | Schuylkill | 470 | | | | |
| UNINCORPORATED PLACES | | | | | | |
| Berks Co. Club | Berks | | Spring & Well | 500 (C) | | |
| Berks Co. Farm | Berks | | Creek | 500 (C) | | |
| Bernharts | Berks | 900 | Well | 5,000 (C) | | |
| Blandon | Berks | 800 | | | | |
| Esterly | Berks | 790 | | | | |
| Friedensburg | Berks | 720 | | | | |
| Hyde Park | Berks | 500 | Bernhardts | X (C) | | |
| Leesport | Berks | 615 | | | | |
| Lyon Station | Berks | 511 | | X (U) | | |
| Northmont | Berks | 1,500 | | | | |
| Oakbrook | Berks | 500 | | | | |
| Oley | Berks | 720 | | | Public Supply | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| UNINCORPORATED PLACES | | | | | | |
| Pennside | Berks | 1,500 | | | | |
| Rosedale | Berks | 2,500 | Bernhardts | X (C) | | |
| West Chester Gardens | Chester | | | | Chlorination Plant | |
| Newmanstown | Lebanon | 1,100 | Spring & Well | 1,000 (C) | | |
| Blue Bell | Montgomery | 500 | | | | |
| Fort Washington | " | 800 | | | | |
| Gilbertsville | " | 521 | | | | |
| Linfield | " | 750 | | | | |
| Mont Clare | " | 900 | | | | |
| Sanatoga | " | 500 | | | | |
| Oaks | " | 700 | | | | |
| Stowe | " | 2,000 | Pottstown (1916) | X (C) | | |
| Swedeland | " | 1,150 | | | | |
| Broad Mountain | Schuylkill | 817 | | | | |
| Brocton | Schuylkill | 500 | New Phila. (1916) | X (C) | | |
| Buck Run | Schuylkill | 800 | | | | |
| Cumbola | Schuylkill | 1,385 | New Phila. | X (C) | | |
| Kaska | Schuylkill | 600 | | | | |
| Lytle | Schuylkill | 1,200 | | | | |
| Maryd Station | Schuylkill | 500 | | | | |
| Quakake | Schuylkill | 525 | | | | |
| Silver Creek | Schuylkill | 2,557 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| UNINCORPORATED PLACES | | | | | | |
| Tuscarora | Schuylkill | 790 | New Phila. | X (C) | | |
| Zion Grove | Schuylkill | 600 | | | | |
| FIRST CLASS TOWN-SHIPS | | | | | | |
| Abington | Montgomery | 20,100 | Phila. Surb. | X (F) | | |
| Cheltenham | Montgomery | 16,529 | Phila. Surb. | X (F) | | |
| Lower Merion | Montgomery | 30,253 | Phila. Surb. | X (F) | | |
| Springfield | Montgomery | 5,631 | Phila. Surb. | X (F) | | |
| Upper Moreland | Montgomery | 3,822 | Phila. Surb. | X (F) | | |

Appendix - B

SEWAGE DISPOSAL SYSTEMS — DELAWARE SUB-BASIN

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers * | Treat-ment ** | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | | | | | |
| Chester | Delaware | 55,105 | X | | | | |
| Cities & Boro's 25,000 to 50,000 | | | | | | | |
| None | | | | | | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | | |
| Bristol | Bucks | 11,500 | X | X | | | |
| Coatesville | Chester | 14,586 | X | X | Add. Sewers | | |
| West Chester | " | 12,413 | X | X | " " | | |
| Darby | Delaware | 11,663 | X | | Trunk Sewer | | Chester |
| Lansdowne | " | 10,463 | | | | | |
| Boro's 5,000 to 10,000 | | | | | | | |
| Morrisville | Bucks | 5,552 | | | | | |
| Quakertown | " | 5,010 | X | X | | | |
| Clifton Heights | Delaware | 4,554 | X | | | | Chester |
| Collingdale | " | 7,711 | X | | | | " |
| Media | " | 5,090 | X | X | | | |
| Yeadon | " | 6,729 | X | | Add Sewers | | Chester |
| East Stroudsburg | Monroe | 5,861 | X | X | | | Stroudsburg |
| Stroudsburg | " | 6,131 | X | | Treatment Wks. | Under Const. P.W.A. | E. Stroudsburg |
| Bangor | Northampton | 5,745 | X | | Add. Sewers | | Easton |
| Nazareth | " | 5,480 | X | X | | | |
| Honesdale | Wayne | 5,666 | X | | | | |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X.

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 to 5,000 | | | | | | | |
| Doylestown | Bucks | 4,518 | X | X | | | |
| Downingtown | Chester | 4,260 | X | X | Add. Treat. Wks. | | |
| Kennett Square | " | 3,259 | | | | | |
| Aldan | Delaware | 3,252 | X | | | | Chester |
| East Lansdowne | " | 3,057 | X | | | | " |
| Glen Olden | " | 4,602 | X | | | | " |
| Marcus Hook | " | 4,679 | X | | Add. Sew.Treat.Plt. | Order Issued | |
| Norwood | " | 3,806 | X | | Sanitary Sewers | | " |
| Prospect Park | " | 4,642 | X | | Trunk Sewers | | " |
| Ridley Park | " | 3,480 | | | | | |
| Sharon Hill | " | 4,773 | X | | | | " |
| Swarthmore | " | 4,063 | X | | | | " |
| Upland | " | 2,845 | X | | | | " |
| Wayne P.O.Radnor Twp. | " | 3,000 | X | X | | | |
| Hatboro | Montgomery | 3,214 | | | | | |
| Penn Argyle | Northampton | 4,098 | | | | | |
| Boro's Under 2,500 | | | | | | | |
| Chalfont | Bucks | 623 | | | | | |
| Dublin | " | 623 | | | | | |
| Hulmeville | " | 568 | | | | | |
| Ivyland | " | 321 | | | | | |
| Langhorne | " | 1,452 | | | | | |
| Langhorne Manor | " | 207 | | | | | |
| New Britain | " | 513 | | | | | |
| New Hope | " | 1,119 | | | | | |
| Newton | " | 2,012 | | | | | |
| Richlandtown | " | 693 | | | | | |
| Riegelsville | " | 830 | | | | | |

SEWAGE DISPOSAL SYSTEMS — DELAWARE SUB-BASIN

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's Under 2,500 | | | | | | | |
| South Langhorne | Bucks | 823 | | | | | |
| Trumbauersville | Bucks | 629 | | | | | |
| Tullytown | Bucks | 774 | | | | | |
| Yardly | Bucks | 1,510 | | | | | |
| Avondale | Chester | 898 | | | | | |
| Honey Brook | Chester | 662 | | | | | |
| Malvern | Chester | 1,601 | | | | | |
| Parkesburg | Chester | 2,339 | X | X | | | |
| South Coatesville | Chester | 1,495 | X | X | | | |
| West Grove | Chester | 1,352 | | | | | |
| Colwyn | Delaware | 1,738 | X | | | | Chester |
| Eddystone | Delaware | 2,379 | X | X | | | Chester |
| Folcroft | Delaware | 1,688 | X | | | | Chester |
| Millbourne | Delaware | 438 | X | | | | Chester |
| Morton | Delaware | 1,261 | X | | | | Chester |
| Parkside | Delaware | 1,585 | X | | | | Chester |
| Rose Valley | Delaware | 53 | X | | | | Chester |
| Rutledge | Delaware | 858 | X | | Add. Sewers | | Chester |
| Trainer | Delaware | 1,626 | X | | | | Chester |
| Delaware Water Gap | Monroe | 443 | | | | | |
| Mt. Pocono | Monroe | 613 | | | | | |
| Bryn Athyn | Montgomery | 1,365 | X | | | | West Conshohocken |
| Hatfield | Montgomery | 1,216 | | | | | |
| East Bangor | Northampton | 843 | | | | | |
| Portland | Northampton | 490 | | | | | |
| Roseto | Northampton | 1,791 | | | | | |
| Stockertown | Northampton | 650 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's Under 2,500 | | | | | | | |
| Tatamy | Northampton | 561 | X | | | | Easton |
| Wind Gap | " | 1,352 | | | | | |
| Matamoras | Pike | 1,948 | | | | | |
| Milford | " | 259 | | | | | |
| Bethany | Wayne | 154 | | | | | |
| Hawley | " | 2,049 | | | | | |
| Prompton | " | 195 | | | | | |
| Waymart | " | 1,022 | | | | | |
| Unincorporated Villages | | | | | | | |
| Andalusia | Bucks | 1,200 | | | | | |
| Edgely | " | 1,200 | | | | | |
| Eddington | " | 1,000 | | | | | |
| Fallsington | " | 600 | | | | | |
| Foundrytown | " | 2,800 | | | | | |
| Line Lexington | " | 519 | | | | | |
| Middletown | " | 2,528 | | | | | |
| Neshaminy Falls | " | 500 | | | | | |
| Oakford | " | 500 | | | | | |
| Parkland | " | 500 | | | | | |
| Penns Park | " | 1,000 | | | | | |
| Plumsteadville | " | 750 | | | | | |
| East Nantmeal | Chester | 594 | | | | | |
| Lewisville | " | 514 | | | | | |
| Marshallton | " | 528 | | | | | |
| Paoli | " | 3,500 | | | | | |
| Pomeroy | " | 600 | | | | | |
| Thorndale | " | 500 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Villages | | | | | | | |
| Broomall | Delaware | 1,200 | | | | | |
| Glen Riddle | " | 1,500 | | | | | |
| Lenni | " | 500 | | | | | |
| Lima | " | 500 | | | | | |
| Linwood | " | 4,000 | | | | | |
| Moylan | " | 1,000 | | | | | |
| South Media | " | 600 | | | | | |
| Buck Hill Falls | Monroe | 1,500 | X | X | | | |
| Pocono Manor | " | | X | X | | | |
| Skytop | " | 600 | X | X | | | |
| Haverford | Montgomery | 4,000 | | | | | |
| Horsham | " | 1,200 | | | | | |
| Huntingdon Valley | " | 500 | | | | | |
| Meadow Brook | " | 800 | | | | | |
| Willow Grove | " | 3,000 | | | | | |
| Martins Creek | Northampton | 1,042 | | | | | |
| Paxinosa | " | 500 | | | | | |
| Lackawaxen | Pike | 500 | | | | | |
| Newfoundland | Wayne | 500 | | | | | |
| White Mills | " | 650 | | | | | |
| Townships | | | | | | | |
| Darby Twp. | Delaware | | X | | Disposal Plant | Under Constr. P.W.A. | Chester |
| Haverford Twp. | " | | | | New Sanitary Sewers | | " |
| Lower Chichester Twp. | " | | X | | | | " |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Townships | | | | | | | |
| Nether Providence | Delaware | 3,050 | | | | | |
| Radnor | " | 12,647 | | | Add. Sewers | | |
| | | | | | Treatment Plant | Bldg.P.W.A. | |
| Ridley | " | 8,872 | X | | Add. Sewers | | Chester |
| Springfield | " | 4,719 | X | | Add. Sewers | | " |
| Upper Darby | " | 56,861 | X | X | Add. System | | " |

SEWAGE DISPOSAL SYSTEMS

LEHIGH SUB-BASIN

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers * | Treatment ** | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | | | | | |
| Allentown | Lehigh | 93,915 | X | X | Sewer Ext. | | |
| Bethlehem | " & Northampton | 57,379 | X | X | " " New Disposal Plt. | | Fountain Hill |
| Cities 25,000 to 50,000 | | | | | | | |
| Hazleton | Luzerne | 35,745 | X | | Sewer Ext. & Imp. | | |
| Easton | Northampton | 32,679 | X | X | Add Sewers | | W. Easton |
| Cities 10,000 to 25,000 | | | | | | | |
| None | | | | | | | |
| Boro's 5,000 to 10,000 | | | | | | | |
| Lansford | Carbon | 9,242 | X | | | | Summit Hill |
| Lehighton | " | 6,641 | X | | Disposal Plant | Order Issued | Parryville & Weatherly |
| Palmerton | " | 7,435 | X | X | | | |
| Summit Hill | " | 5,536 | X | | Add Sewers | | Lansford |
| Emaus | Lehigh | 6,410 | X | | | | |
| Freeland | Luzerne | 7,182 | | | | | |
| Northampton | Northampton | 9,748 | X | X | | | |
| Wilson | " | 8,185 | | | New Sewer System | | |
| Coaldale | Schuylkill | 6,706 | X | | | | Lansford Summit Hill |

* Existing public sewers designated by X. ** Existing sewage treatment plants designated by X.

| Name of City, Boro or Twp., | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 to 5,000 | | | | | | | |
| East Mauch Chunk | Carbon | 3,687 | X | | | | Mauch Chunk |
| Mauch Chunk | " | 2,975 | | | | | E. " " |
| Weatherly | " | 2,531 | X | | Sewer Ext. | | Leighton |
| Catasauqua | Lehigh | 4,621 | | | | | |
| Coplay | " | 3,171 | | | | | |
| Fountain Hill | " | 4,692 | X | | | | Bethlehem |
| Slatington | " | 4,826 | X | | Change creek bed & Sewer Ext. | | |
| Hellerton | Northampton | 3,913 | | | | | |
| Boro's 2,500 & Less | | | | | | | |
| Beaver Meadows | Carbon | 2,086 | X | | Sanitary Sewer System | Bldg. P.W.A. | |
| Bowmanstown | " | 843 | | | Disposal Plt. | | |
| East Side | " | 206 | | | | | |
| Parryville | " | 627 | | | | | Leighton |
| Weissport | " | 710 | | | | | |
| Alburtis | Lehigh | 883 | | | | | |
| Coopersburg | " | 1,072 | | | | | |
| Macungie | " | 801 | | | | | |
| Bath | Northampton | 1,730 | | | | | |
| Chapman | " | 234 | | | | | |
| Freemansburg | " | 1,475 | | | | | |
| Glendon | " | 590 | | | | | |
| North Catasauqua | " | 2,410 | | | | | |
| Walnutport | " | 1,191 | | | | | |
| West Easton | " | 1,516 | X | | | | Easton |

| Name of City, Boro or Twp., | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns & Villages | | | | | | | |
| 500 and Over | | | | | | | |
| Topton | Berks | 1,721 | | | | | |
| Junedale | Carbon | 595 | | | | | |
| Leviston | " | 595 | | | | | |
| Nesquehoning | " | 4,176 | | | | | |
| New Columbus | " | 1,750 | | | | | |
| Packerton | " | 590 | | | | | |
| Tresckow | " | 1,856 | | | | | |
| Albrights | Lehigh | 500 | | | | | |
| Cementon | " | 2,030 | | | | | |
| Center Valley | " | 700 | | | | | |
| Egypt | " | 1,489 | | | | | |
| Fogelsville | " | 513 | | | | | |
| Fullerton | " | 3,075 | | | | | |
| Gauffs Hill | " | 650 | | | | | |
| Hokendauqua | " | 1,298 | | | | | |
| Slatedale | " | 640 | | | | | |
| So. Allentown | " | 2,549 | | | | | |
| Stiles | " | 721 | | | | | |
| West Catasauqua | " | 1,500 | | | | | |
| Cranberry Jct. | Luzerne | 600 | | | | | |
| Drifton | " | 1,400 | | | | | |
| Eckley | " | 825 | | | | | |
| Jeanesville | " | 500 | | | | | |
| Stockton | " | 742 | | | | | |
| Danielsville | Northampton | 1,184 | | | | | |

SEWAGE DISPOSAL SYSTEMS — SCHUYLKILL SUB-BASIN

| Name of City, Boro or Twp., | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| CITIES 100,000 or More | | | * | ** | | | |
| Reading | Berks | 108,445 | X | X | Add. Sewers & Impr. | | |
| Philadelphia | Philadelphia | 1,868,060 | X | X | Add. Sewers & Treat. Plant | | Jenkintown Boro Narbeth, Chelten-ham, Lower Merion Haverford Twps. |
| CITIES 25,000 to 50,000 | | | | | | | |
| Norristown | Montgomery | 36,163 | X | X | | | |
| Pottsville | Schuylkill | 26,114 | X | | | | Port Carbon & Mt. Carbon |
| CITIES 10,000 to 25,000 | | | | | | | |
| Phoenixville | Chester | 11,871 | | | Com. New Sewers | Order Issued | |
| Conshohocken | Montgomery | 10,762 | X | | Disposal Plant | Pending W.P.A. West Conshohocken | |
| Pottstown | Montgomery | 20,617 | X | X | | | |
| Tamaqua | Schuylkill | 12,864 | X | | | | |
| BOROUGH'S 5,000 to 10,000 | | | | | | | |
| West Reading | Berks | 5,263 | X | X | | | |
| Bridgeport | Montgomery | 5,780 | X | X | | | |
| Lansdale | Montgomery | 8,950 | X | X | | | |
| Minersville | Schuylkill | 9,029 | X | | Sewer Ext. | | |
| Saint Claire | Schuylkill | 6,864 | | | | | |
| Schuylkill Haven | Schuylkill | 6,899 | | | | | |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X

| Name of City, Boro or Twp., | County | Estimated Pop-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| BOROUGH'S 2,500 to 5,000 | | | | | | | |
| Birdsboro | Berks | 3,516 | | | | | |
| Boyertown | Berks | 4,152 | | | | | |
| Hamburg | Berks | 3,873 | X | | | | |
| Kutztown | Berks | 2,827 | | | | | |
| Laureldale | Berks | 3,209 | | | | | |
| Mount Penn | Berks | 3,141 | | | Disposal Plant Sewers | Under Constr. P.W.A. | |
| Shillington | Berks | 4,890 | | | | | |
| Wyomissing | Berks | 3,309 | X | X | | | |
| Perkasie | Bucks | 3,309 | X | X | | | |
| Spring City | Chester | 3,010 | X | X | Add. Sewer System | Pending P.W.A. | |
| Myerstown | Lebanon | 2,580 | | | | | |
| Ambler | Montgomery | 4,327 | X | | Add. Public Sewers | Under Constr. P.W.A. | West Con-shohocken |
| Jenkintown | Montgomery | 4,923 | X | X | | Treat at Phila. | |
| Narbeth | Montgomery | 4,818 | X | | | | Lower Merion Twp. |
| North Wales | Montgomery | 2,535 | X | X | | | |
| Royersford | Montgomery | 3,981 | | | | | |
| Souderton | Montgomery | 3,808 | X | X | | | |
| West Conshohocken | Montgomery | 2,548 | X | | | | Conshohocken |
| New Philadelphia | Schuylkill | 2,714 | X | | | | |
| Port Carbon | Schuylkill | 3,402 | X | | | | Pottsville & Mt. Carbon |

| Name of City, Boro or Twp., | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| BOROUGH'S 2,500 and Less | | | | | | | |
| Bally | Berks | 532 | | | | | |
| Bechtelsville | Berks | 595 | | | | | |
| Bernville | Berks | 349 | | | | | |
| Centerport | Berks | 148 | | | | | |
| Fleetwood | Berks | 2,093 | | | | | |
| Kenhorst | Berks | 1,600 | | | | | |
| Lenhartsville | Berks | 182 | | | | | |
| Lyons | Berks | 511 | | | | | |
| Mohnton | Berks | 1,973 | | | | | |
| Robesonia | Berks | 1,574 | | | | | |
| Saint Lawrence | Berks | 815 | | | | | |
| Shoemakersville | Berks | 956 | | | | | |
| Sinking Spring | Berks | 2,259 | | | | | |
| Strausstown | Berks | 366 | | | | | |
| Temple | Berks | 1,626 | | | | | |
| Wernersville | Berks | 1,110 | | | | | |
| West Lawn | Berks | 2,278 | | | | | |
| West Leesport | Berks | 449 | | | | | |
| Womelsdorf | Berks | 1,392 | | | | | |
| Wyomissing Hills | Berks | 486 | | | | | |
| Sellersville | Bucks | 2,016 | X | X | | | |
| Silverdale | Bucks | 294 | | | | | |
| Telford | Bucks | 423 | X | | Disposal Plant | Order Issued | |
| Richland | Lebanon | 1,014 | | | | | |
| Collegeville | Montgomery | 903 | | | | | |

| Name of City, Boro or Twp., | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| BOROUGH'S | | | | | | | |
| 2,500 and Less | | | | | | | |
| East Greenville | Montgomery | 1,746 | | | | | |
| Green Lane | Montgomery | 426 | | | | | |
| Pennsburg | Montgomery | 1,413 | | | | | |
| Red Hill | Montgomery | 800 | | | | | |
| Rock Ledge | Montgomery | 1,981 | | | | | |
| Schwenkville | Montgomery | 470 | | | | | |
| Trappe | Montgomery | 437 | | | | | |
| West Telford | Montgomery | 1,298 | | | | | |
| Auburn | Schuylkill | 1,154 | | | | | |
| Cressona | Schuylkill | 1,970 | | | | | |
| Landingville | Schuylkill | 253 | | | | | |
| Mechanicsville | Schuylkill | 764 | | | | | |
| Mount Carbon | Schuylkill | 323 | X | | | | Pottsville & Port Carbon |
| New Ringgold | Schuylkill | 499 | | | | | |
| Orwigsburg | Schuylkill | 2,177 | | | | | |
| Palo Alto | Schuylkill | 1,946 | X | | New Sewers | | |
| Port Clinton | Schuylkill | 470 | X | | | | |
| UNINCORPORATED VILLAGES | | | | | | | |
| Berks Co. Club | Berks | | | | | | |
| Berks Co. Farm | Berks | | | X | | | |
| Bernharts | Berks | 900 | | | | | |
| Blandon | Berks | 800 | | | | | |
| Esterly | Berks | 790 | | | | | |
| Friedensburg | Berks | 720 | | | | | |

| Name of City, Boro or Twp., | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| UNINCORPORATED VILLAGES | | | | | | | |
| Hyde Park | Berks | 500 | | | | | |
| Leesport | Berks | 615 | | | | | |
| Lyon Station | Berks | 511 | | | | | |
| Northmont | Berks | 1,500 | | | | | |
| Oakbrook | Berks | 500 | | | | | |
| Oley | Berks | 720 | | | | | |
| Pennside | Berks | 1,500 | | | | | |
| Rosedale | Berks | 2,500 | | | | | |
| Newmanstown | Lebanon | 1,100 | | | | | |
| Blue Bell | Montgomery | 500 | | | | | |
| Fort Washington | Montgomery | 800 | | | | | |
| Gilbertsville | Montgomery | 521 | | | | | |
| Linfield | Montgomery | 750 | | | | | |
| Mont Clare | Montgomery | 900 | | | | | |
| Oaks | Montgomery | 700 | | | | | |
| Sanatoga | Montgomery | 500 | | | | | |
| Stowe | Montgomery | 2,000 | | | | | |
| Swedeland | Montgomery | 1,150 | | | | | |
| Broad Mountain | Schuylkill | 817 | | | | | |
| Brockton | Schuylkill | 500 | | | | | |
| Buck Run | Schuylkill | 800 | | | | | |
| Cumbola | Schuylkill | 1,385 | | | | | |
| Kaska | Schuylkill | 600 | | | | | |
| Lytle | Schuylkill | 1,200 | | | | | |
| Maryd Station | Schuylkill | 500 | | | | | |
| Quakake | Schuylkill | 525 | | | | | |

| Name of City, Boro or Twp., | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| UNINCORPORATED VILLAGES | | | | | | | |
| Silver Creek | Schuylkill | 2,557 | | | | | |
| Tuscarora | Schuylkill | 790 | | | | | |
| TOWNSHIPS | | | | | | | |
| Easttown Twp | Chester | 2,657 | X | X | | | |
| Abington Twp | Montgomery | 20,100 | X | | Sewer Ext. & Disposal Plant | | |
| Cheltenham Twp | Montgomery | 16,529 | X | | | Treated at Phila. | |
| East Norriton Twp | Montgomery | 1,977 | | | | | |
| Lower Merion Twp | Montgomery | 30,253 | X | | Sewers & Disposal Plant | | Narbeth, Phila., & Haverford Twps. |
| Springfield Twp | Montgomery | 5,631 | X | | | | With Phila. |
| Upper Moreland Twp | Montgomery | 3,822 | X | X | | | |

DRAINAGE BASIN STUDY

OF

PENNSYLVANIA

PART II

SUSQUEHANNA, POTOMAC, GENESEE RIVERS

AND CHESAPEAKE BAY

PENNSYLVANIA STATE PLANNING BOARD
HARRISBURG, PA.



- 1937 -

PENNSYLVANIA STATE PLANNING BOARD



---

928 North Third Street
Harrisburg, Pennsylvania

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG
928 North Third Street

December 31, 1937

Honorable George H. Earle, III
Governor of Pennsylvania
Harrisburg, Pennsylvania

Dear Governor Earle:

On behalf of the State Planning Board, I respectfully submit to you the three volumes of the DRAINACE BASIN STUDY OF PENNSYLVANIA.

This report contains detailed information and data concerning Pennsylvania's water rescurces and problems, which had not been assembled hitherto. It is presented as a reference work for the various State Departments, Federal Agencies and Health and Water Engineers.

Sincerely yours,

Ralph M. Bashore

Ralph M. Bashore
Chairman

RMB:MH

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG

928 North Third Street

November 29, 1937

Hon. Ralph M. Bashore, Chairman
State Planning Board
Harrisburg, Pennsylvania

Dear Mr. Bashore:

The Staff of the State Planning Board herewith respectfully submits Part II of the Drainage Basin Study of Pennsylvania.

This, the second of three volumes, covers the Upper Chesapeake Bay, Potomac and Susquehanna River Basins. Part III, covering the Drainage Basins in the western portion of the State, will be transmitted to you in the near future.

George R. Copeland, Assistant Director, and James A. Patterson, Research and Planning Supervisor, supervised the compilation of the data contained in this report. Mr. Patterson was also responsible for the arrangement of this material for publication.

A complete statement of the objectives of this study together with acknowledgments to cooperating agencies are included in the preface.

Very truly yours,

F. A. Pitkin
Executive Director

FAP:MH

# PREFACE

Studies of the Drainage Basins in the United States were initiated by the Water Resources Committee of the National Resources Committee early in 1936, and were carried out in collaboration with the Planning Boards of the cooperating States. Water Consultants were appointed by the National Resources Committee for each major Drainage Basin. The Pennsylvania State Planning Board cooperated with the Consultants in the collection and compilation of data for these studies. The objectives of the studies were:

(1) To determine the principal water problems in the various drainage areas of the country.

(2) To outline an integrated pattern of water development and control designed to solve those problems.

(3) To present specific construction projects and investigation projects as elements of the integrated pattern or plan, with priorities of importance and time.

This report presents data and information furnished to the Water Consultants for the preparation of the National Resources Committee Report, "Drainage Basin Problems and Programs", December, 1936. Inasmuch as the report of the National Resources Committee is a summary report, most of the available detailed supporting information was not published. It is the purpose of this report to make available to the water and health engineers, and to the interested State Departments and Federal Bureaus, as reference material, the detailed information and data collected by the Pennsylvania State Planning Board.

Due to the limitations of time and personnel, it was not possible to make detailed studies of projects submitted, especially with regard to cost estimates. Some meritorious projects have undoubtedly been omitted

due to lack of information, and some others which are included may be under construction at the present time. In many cases the proposed projects for new public water supplies included no plans or cost estimates. These projects are shown on the Project Map as proposed untreated water supplies pending the receipt of information concerning the type of treatment necessary.

This report is not to be regarded as complete or final, but rather as a preliminary report, subject to corrections and refinements, from which it is hoped that a satisfactory plan for water use development in Pennsylvania may be evolved. Communications regarding corrections and additions will be welcomed by the Pennsylvania State Planning Board.

Grateful acknowledgment is made to the members of the Water Resources Sub-Committee of the State Planning Board for their generous contributions of advice and information which made these studies possible.

Further acknowledgment is made to the various State Departments and Federal Agencies for their cooperation in making available data and information.

Acknowledgment is likewise made for technical, clerical, drafting, and duplicating assistance furnished by the Works Progress Administration under the Federally sponsored project #265-6905.

Water Resources Committee

of the

National Resources Committee

Abel Wolman, Chairman

| | |
|---|---|
| Harlan H. Barrows | John C. Page |
| Hugh H. Bennett | Thorndike Saville |
| Ira N. Gabrielson | R. E. Tarbett |
| N. C. Grover | Thomas R. Tate |
| Edward Hyatt | Sherman M. Woodward |
| Edward M. Markham, Represented by William A. Snow | Gilbert F. White, Secretary |

National Resources Committee Staff Members in charge of Drainage Basin Study.

Frederick H. Fowler, Director
Merton L. Emerson, Assistant Director
B. S. Drane, Office Coordinator
H. T. Critchlow, Regional Coordinator
J. W. Guilday, Administrative Assistant

National Resources Committee Consultants and assistants in direct charge of the portion of the study dealing with Pennsylvania.

| | |
|---|---|
| Delaware Basin | - N. B. Jacobs, Regional Consultant<br>I. S. Walker, Associate Consultant<br>E. O. Goldstein, Jr. Asst. Engineer |
| Susquehanna Basin | - N. B. Jacobs, Regional Consultant<br>M. B. Moore, Jr. Asst. Engineer |
| Upper Ohio Basin | - F. H. Weed, Regional Consultant<br>D. E. Davis, Associate Consultant |
| Potomac Basin | - W. M. Piatt, Regional Consultant |
| Chesapeake Basin | - W. M. Piatt, Regional Consultant |
| Lake Erie Basin | - L. K. Sherman, Regional Consultant |
| Genesee Basin | - L. K. Sherman, Regional Consultant |

## Water Resources Sub-Committee

of the

## Pennsylvania State Planning Board

### Members

Dr. James F. Bogardus, Chairman
Secretary of Forests and Waters.
Member of State Planning Board.

Charles E. Ryder,
Chief Engineer, Water and Power Resources Board.

Dr. W. L. Stevenson,
Chief Engineer, Sanitary Water Board.

Dr. George H. Ashley,
State Geologist

J. W. Mangan,
District Engineer, U. S. Geological Survey.

Charles S. Ling,
Meteorologist, U. S. Weather Bureau.

---

### Advisors

Lt. Col. E. J. Dent,
District Engineer, Baltimore, Md.
Corps of Engineers, U. S. Army.

Lt. Col. John C. H. Lee,
District Engineer, Philadelphia, Pa.
Corps of Engineers, U. S. Army.

Lt. Col. William E. R. Covell,
District Engineer, Pittsburgh, Pa.
Corps of Engineers, U. S. Army.


Pennsylvania's Drainage Structure

(Frontispiece)

CONTENTS

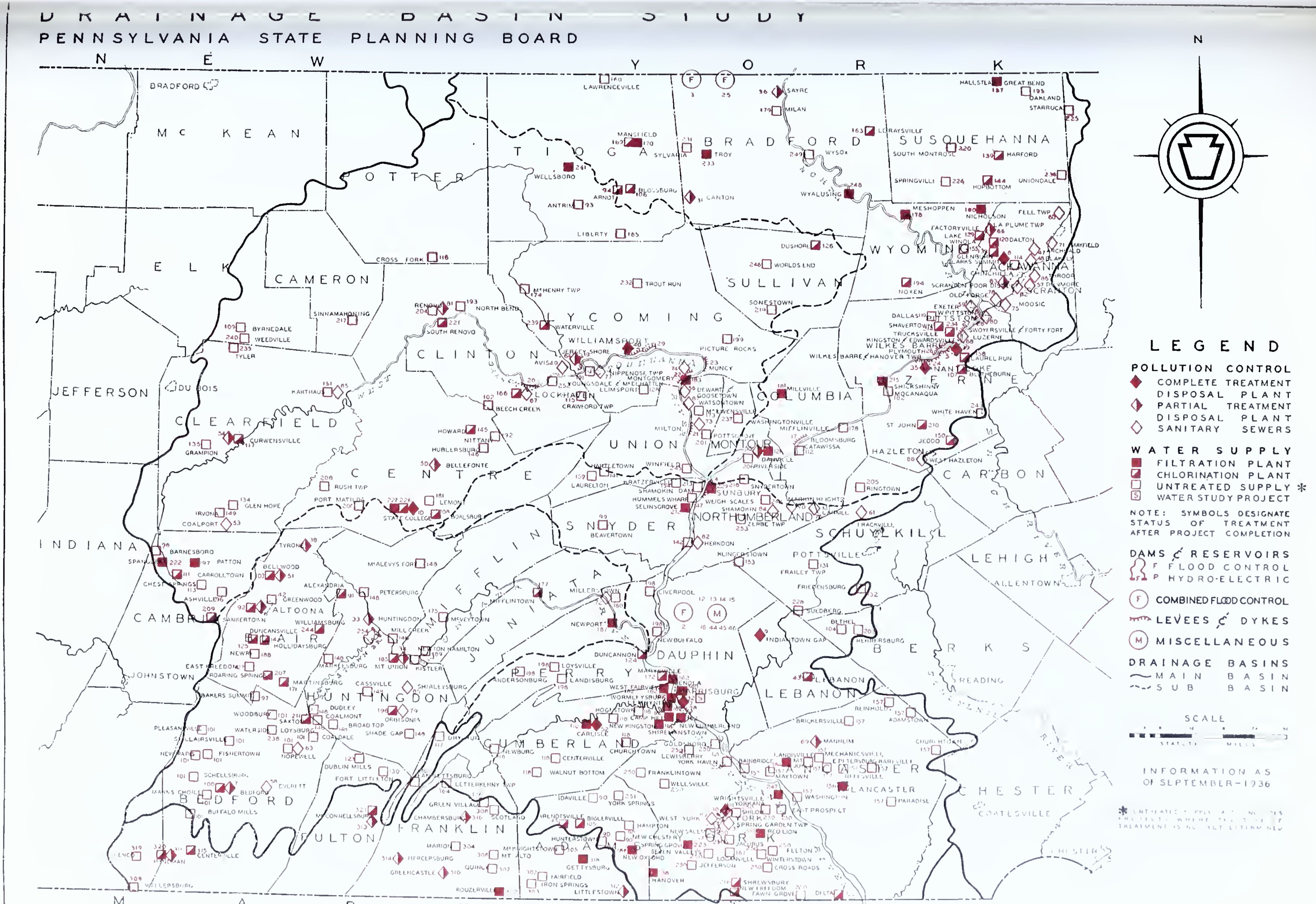
Part II

TABLES

SUSQUEHANNA BASIN



POTOMAC BASIN




PROJECT MAP: SUSQUEHANNA & POTOMAC RIVER BASINS

FIGURE I

# I GENERAL DESCRIPTION OF THE SUSQUEHANNA BASIN 1/

(a) Maximum Length:---Approximately 157 miles in Pennsylvania.

(b) Maximum Breadth:---Approximately 161 miles in Pennsylvania.

(c) Area:---Total 27,400 square miles.

Area of sub-basins in Pennsylvania:---

| | |
|---|---|
| North Branch | 5,007 square miles. |
| West Branch | 6,913 square miles. |
| Juniata River | 3,426 square miles. |
| Lower Susquehanna River | 5,571 square miles. |
| Total in Pennsylvania | 20,917 Square Miles. 2/ |

(d) Physiography:---

1. Topography:---The Basin lies in the three main geographic divisions of Pennsylvania; the northern portion in the well dissected Allegheny Plateau; the central portion in the rugged Allegheny Mountains; and the lower portion in the rolling Piedmont Plateau. Between Northumberland and Harrisburg the stream cuts through a series of parallel mountain ridges, forming picturesque water gaps.

2. Geology:---The geological formations of the Basin are extremely varied. The upper portion contains principally shale and sandstone outcrops. The eastern portion of the middle or mountainous region

1/ Source:---Paragraphs (a) and (b) scaled from Stream Map of Pennsylvania- 6 miles = 1 inch. Paragraphs (c) and (d) Water Resources Inventory Report, Part III - Gazateer of Streams - Pennsylvania - Water Supply Commission, Harrisburg, Pennsylvania, 1916. Paragraph (f) Preliminary Report of Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934, Page 69.

2/ Where mentioned hereafter except as noted the term Susquehanna Basin will refer to that portion in Pennsylvania.

is rich in shale and sandstone, containing the noted anthracite deposit of the Wyoming Valley in the vicinity of Wilkes-Barre and Scranton, and other anthracite coal deposits in southern Luzerne, Carbon, Schuylkill and Northumberland Counties. The western mountainous region abounds in extensive limestone deposits in the valleys, containing some iron ore and many strong flowing springs. The lower or Piedmont Plateau region has extensive limestone valleys on Conodoguinet, Yellow Breeches, Swatara, Codorus, Big Chickies, Conestoga and Pequea creeks. The formations of the higher areas are principally slate, sandstone and trap rock.

3. Channel:---From Northumberland to a point about 12 miles below Columbia the river is wide and shallow, averaging about a mile in width, and contains many rocky islands, some of which are cultivated. About 23 miles above the Pennsylvania-Maryland boundary the stream enters a gorge, where it becomes narrow and rapid, and on either shore is for the most part flanked by rocky bluffs surmounted by a table-land 100 to 500 feet above the water.

4. Profile:---Rate of fall per mile:from Northumberland to Safe Harbor, 95 miles, 2.8 feet; thence to McCall Ferry Dam (crest) 7.5 miles, 0.4 feet; thence from base of dam, elevation 115, to State boundary, 9.5 miles, 4.6 feet. The following table gives elevations at various points with distances above the Pennsylvania-Maryland boundary:

| Location | Distance Above Pa.-Md. Boundary | Elevation Above Sea Level |
|---|---|---|
| | Miles | Feet |
| Pennsylvania-Maryland Boundary | 0.0 | 71 |
| McCall Ferry Dam (50 Feet High) | 9.5 | *165 |
| Safe Harbor | 17.0 | 168 |
| Turkey Hill | 22.0 | 200 |
| Columbia | 28.0 | 226 |
| York Haven | 41.5 | 259 |
| Harrisburg | 56.5 | 296 |
| Clarks Ferry Dam | 72.0 | 339 |
| Liverpool | 87.0 | 378 |
| Dalmatia | 94.5 | 392 |
| Selinsgrove | 105.5 | 414 |
| Sunbury | 111.0 | 428 |
| Northumberland | 112.0 | 430 |

* Crest.

(e) Cover:---See Reconnaissance Land Use Map (Fig. II & III). Table I shows the proportion of various types of cover in the Basin.

(f) Climate:---

North Branch Sub-Basin. The average annual rainfall is approximately 39 inches and the average annual snowfall about 50 inches. Mean annual temperatures vary from 46° to 48° with maximums of 90° or higher recorded frequently during the summer months. Minimums of 25° below zero are occassionally recorded during the winter. The prevailing winds are west and north west.

West Branch Sub-Basin. The average annual rainfall is approximately 39 inches and the average annual snowfall about 50 inches. The mean annual temperature varies from 46° to 48°, summer maximums of 90° or higher and winter minimums of 25° below zero are frequent. The prevailing winds are west and north west.

Juniata Sub-Basin. The mean annual precipitation is approximately 42 inches and the mean annual temperature about 50°. Maximum temperatures of 90° or higher are recorded on an average of 10 days during the summer, while the average number of days with freezing temperatures is over 100 with minimum temperatures of 20° to 25° below zero not uncommon. Prevailing winds are from the west and south west.

Lower Susquehanna Sub-Basin. The average annual precipitation for this region is approximately 42 inches, and snowfall averages 35 to 40 inches yearly. The average summer mean temperature is about 72° and the winter mean about 30°. Maximum temperatures of 100° or higher are recorded frequently during the summer. The prevailing winds are from the west and south west.

TABLE I

APPROXIMATE FOREST AND CLEARED LAND CLASSIFICATION BY WATERSHEDS

SUSQUEHANNA RIVER DRAINAGE BASIN IN PENNSYLVANIA

| Watershed | Land Area Figures in Thousands of Acres | | | | | Per Cent of Land Area | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Forested | Cleared | | Urban R.R., Highways etc. | Total Land | Forested | Cleared | | |
| | | Non-farm | Farm | | | | Non-Farm | Farm | Other |
| North Branch | 1,336 | 142 | 1,525 | 201 | 3,204 | 42 | 4 | 48 | 6 |
| West Branch | 3,138 | 163 | 953 | 170 | 4,424 | 71 | 4 | 21 | 4 |
| Juniata | 1,219 | 100 | 745 | 129 | 2,193 | 55 | 5 | 34 | 6 |
| Lower Susquehanna (Above Harrisburg) | 692 | 50 | 721 | 141 | 1,604 | 43 | 3 | 45 | 9 |
| (Below Harrisburg) | 376 | 42 | 1,342 | 131 | 1,891 | 20 | 2 | 71 | 7 |
| Total* | 6,761 | 497 | 5,286 | 772 | 13,316 | 51 | 4 | 39 | 6 |

* Excludes area of water in the largest rivers. U. S. Census "Land Areas".

Note: Prepared from "County Area" data in the files of the Department of Forests and Waters; assuming parts of counties in watersheds have same proportions of each land class as the entire county.

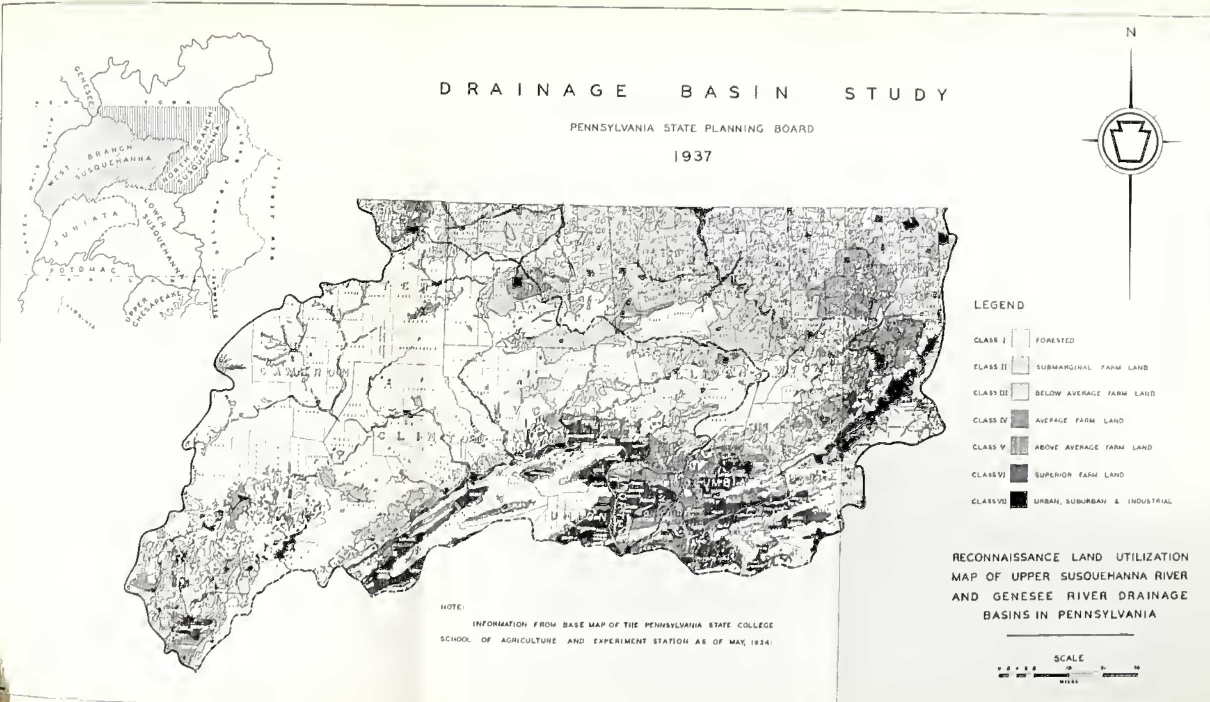
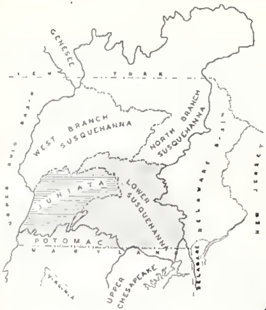

DRAINAGE BASIN STUDY
PENNSYLVANIA STATE PLANNING BOARD
1937
N
GENESEE
WEST BRANCH SUSQUEHANNA
NORTH BRANCH SUSQUEHANNA
JUNIATA
LOWER SUSQUEHANNA
POTOMAC
UPPER CHESAPEAKE
CAMERON
LEGEND
CLASS I FORESTED
CLASS II SUBMARGINAL FARM LAND
CLASS III BELOW AVERAGE FARM LAND
CLASS IV AVERAGE FARM LAND
CLASS V ABOVE AVERAGE FARM LAND
CLASS VI SUPERIOR FARM LAND
CLASS VII URBAN, SUBURBAN & INDUSTRIAL
RECONNAISSANCE LAND UTILIZATION MAP OF UPPER SUSQUEHANNA RIVER AND GENESEE RIVER DRAINAGE BASINS IN PENNSYLVANIA
SCALE
MILES
NOTE:
INFORMATION FROM BASE MAP OF THE PENNSYLVANIA STATE COLLEGE SCHOOL OF AGRICULTURE AND EXPERIMENT STATION AS OF MAY, 1934.

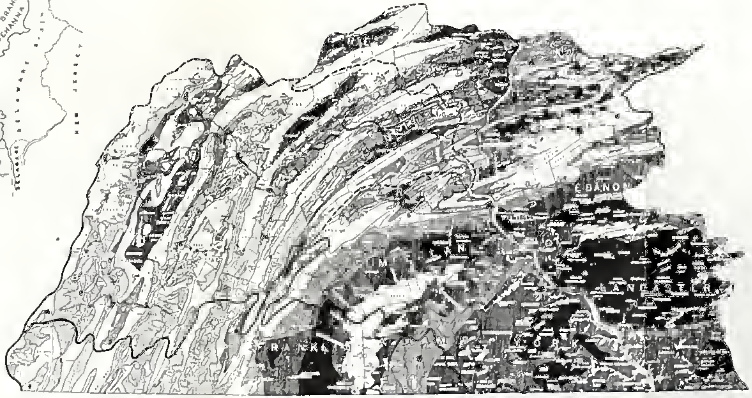
FIGURE II

# DRAINAGE BASIN STUDY

PENNSYLVANIA STATE PLANNING BOARD

1937

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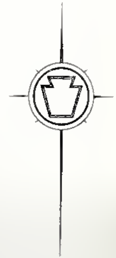


LEGEND

| | | |
|---|---|---|
| CLASS I | | FORESTED |
| CLASS II | | SUBMARGINAL FARM LAND |
| CLASS III | | BELOW AVERAGE FARM LAND |
| CLASS IV | | AVERAGE FARM LAND |
| CLASS V | | ABOVE AVERAGE FARM LAND |
| CLASS VI | | SUPERIOR FARM LAND |
| CLASS VII | | URBAN SUBURBAN & INDUSTRIAL |

NOTE:

INFORMATION FROM BASE MAP OF THE PENNSYLVANIA STATE COLLEGE SCHOOL OF AGRICULTURE AND EXPERIMENT STATION AS OF MAY, 1934.

RECONNAISSANCE LAND UTILIZATION MAP OF LOWER SUSQUEHANNA RIVER, JUNIATA RIVER, POTOMAC RIVER & UPPER CHESAPEAKE BAY DRAINAGE BASINS IN PENNSYLVANIA

SCALE

MILES

FIGURE III

## II HUMAN OCCUPANCY

In 1930, the Susquehanna Basin within Pennsylvania had a population of 2,473,955 persons 3/. This comprised 23.2 per cent of the population of Pennsylvania and 2.0 percent of the population of the United States.

The average density of population was 118 per square mile in 1930. Figure IV shows the distribution of population in the various drainage basins of the State.

(a) Cities and Towns: --- Information regarding the number, classification by population, size and rate of development, and general characteristics of cities and towns of the Basin is given in tables II and III.

North Branch Sub-basin. In 1930, this sub-basin had a population of 897,109 persons, or 36.2 per cent of the entire Susquehanna Basin in Pennsylvania. The average density of population was 179 persons per square mile. Tables II and III show the number, classification by population, size and rate of growth of cities, boros and townships in this area.

The population of cities and boros in the sub-basin increased approximately 65 per cent during the period 1900 to 1930 though there has been a slight decrease in population during the period 1930 to 1934. The population of townships decreased 6.9 percent from 1900 to 1930 and increased 4.5 per cent from 1930 to 1934. During the period 1900 to 1930 there has been a general population flow into cities and boros while from 1930 to 1934 this trend has been slightly reversed. It is believed that this latter trend is a temporary one due to the depression and that people will continue to live in communities where greater benefits and a

3/ Based on U. S. Census 1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each Basin is estimated as proportional to area. Towns on the line are placed in one Basin or the other.

more abundant life can be obtained.

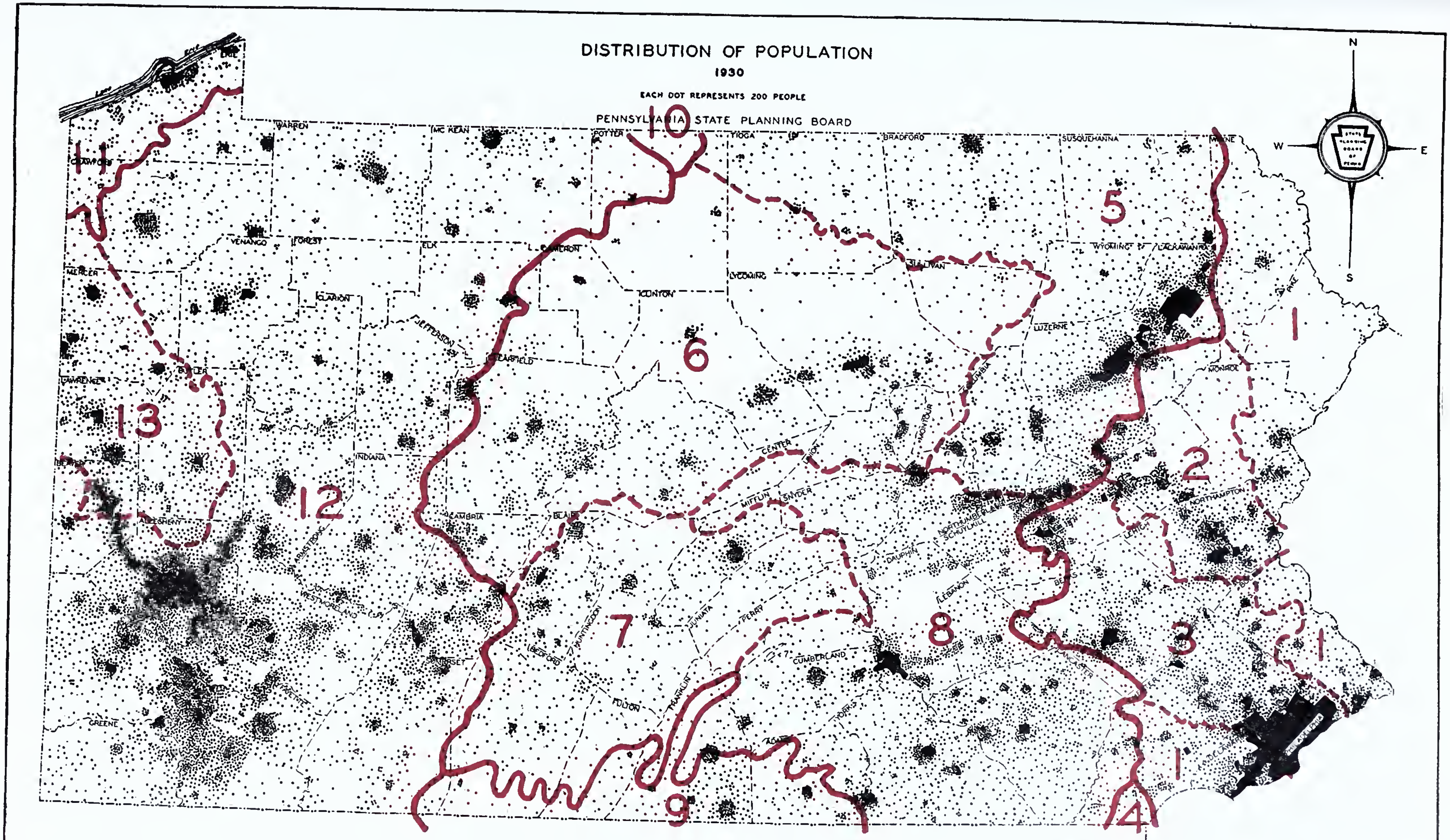
West Branch Sub-Basin. In 1930 this sub-basin had a population of 361,214 persons. This was about 14.6 per cent of the population of the entire Susquehanna Basin in Pennsylvania. The average density of population was 52 persons per square mile. Tables II-A and III-A show the number, classification by population, size and rate of growth of cities, boros and townships in this sub-basin.

The population of cities and boros increased 41 per cent during the period 1900 to 1930; and this trend has continued to 1934. The population of townships decreased during the period 1900 to 1930 but has shown a slight increase from 1930 to 1934. Although the cities and boros in this sub-basin have had a continual increase in population, the area is largely rural since the township population comprises about one-half the total population. The reversal of trend for the township population during the last five years is indicative of a back to the land movement which is believed to have been caused by the depression.

Juniata Sub-Basin. In 1930 this sub-basin had a population of 278,062 persons. This was about 11.2 per cent of the population of the Susquehanna Basin in Pennsylvania. The average density of population in that year was 81 per square mile. Tables II-B and III-B show the number, classification and rate of development of cities and boros in this area.

The population of cities and boros in this sub-basin has increased rapidly from 1900 to 1934. This increase has been due largely to the growth of Altoona, Lewistown and Mt. Union. The township or rural population has remained nearly constant from 1900 to 1930, but from 1930 to 1934 has increased nearly 15 per cent.

Lower Susquehanna Sub-Basin. In 1930 this sub-basin had a population of 937,570 persons which was 37.9 percent of the population of the Susquehanna Basin in Pennsylvania. The average density of population




DELAWARE BASIN
1. DELAWARE
2. LEHIGH
3. SCHUYLKILL
4. CHESAPEAKE BASIN

SUSQUEHANNA BASIN
5. NORTH BRANCH
6. WEST BRANCH
7. JUNIATA
8. LOWER SUSQUEHANNA
9. POTOMAC BASIN

10. GENESEE BASIN
11. ERIE BASIN
OHIO BASIN
12. UPPER OHIO
13. BEAVER

DRAINAGE BASINS
SHOWN IN THEIR RELATION TO DISTRIBUTION OF POPULATION AS OF 1930
SEPTEMBER - 1937

FIGURE IV

was 168 per square mile in 1930. Tables II-C and III-C show the number, classification by population, and rate of development of cities, boros and townships in this area.

There has been a continued increase in growth of population of cities and boros during the period 1900 to 1934, while the population of townships has increased slightly over the same period of years.

TABLE II

POPULATION CLASSIFICATION OF NORTH BRANCH SUSQUEHANNA BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934 ** Population | ESTIMATED 1934 ** Per Cent of Total Basin | ESTIMATED 1934 ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100,000 or Over | 1 | 102,030 | 15.6 | 143,432 | 16.0 | 19.0 | 138,207 | 15.3 | 18.4 | 41,402 | 40.6 | 5,225- | -3.8 |
| 50,000 to 100,000 | 1 | 51,720 | 7.9 | 86,626 | 9.7 | 11.4 | 85,259 | 9.4 | 11.3 | 34,906 | 67.5 | 1,367- | -1.6 |
| 25,000 to 50,000 | 1 | 12,120 | 1.9 | 26,043 | 2.9 | 3.4 | 26,728 | 3.0 | 3.6 | 13,923 | 114.9 | 685 | 2.6 |
| 10,000 to 25,000 | 10 | 86,770 | 13.3 | 157,964 | 17.6 | 20.9 | 154,824 | 17.1 | 20.6 | 71,194 | 82.0 | 3,140- | -2.0 |
| 5,000 to 10,000 | 20 | 73,500 | 11.3 | 151,217 | 16.9 | 20.0 | 150,805 | 16.7 | 20.0 | 77,717 | 105.7 | 412- | -.3 |
| 2,500 to 5,000 | 11 | 26,950 | 4.1 | 41,261 | 4.5 | 5.4 | 39,437 | 4.4 | 5.2 | 14,311 | 53.1 | 1,824- | -4.6 |
| Under 2,500 | 55 | 45,874 | 7.0 | 53,123 | 5.9 | 7.1 | 60,277 | 6.7 | 8.0 | 7,249 | 15.8 | 7,154 | 13.5 |
| TOTAL CITIES & BOROS | 99 | 398,964 | 61.1 | 659,666 | 73.5 | 87.2 | 655,537 | 72.6 | 87.1 | 260,702 | 65.3 | 4,129- | -.6 |
| TOWNSHIPS | | 253,711 | 38.9 | 237,443 | 26.5 | - | 248,099 | 27.4 | - | 16,268 | -6.9 | 10,656 | 4.5 |
| Unincorporated Towns & Villages | | | | *97,009 | 10.8 | 12.8 | *97,009 | 10.7 | 12.9 | - | | - | |
| Scattered | | | | 140,434 | 15.7 | - | 151,090 | 16.7 | - | - | | 10,656 | 7.6 |
| TOTAL Population Residing in Communities | | | | 756,675 | 84.3 | 100.0 | 752,546 | 83.3 | 100.0 | | | 4,129- | -.5 |
| GRAND TOTAL NORTH BRANCH SUB-BASIN | | 652,675 | 100.0 | 897,109 | 100.0 | | 903,636 | 100.0 | | 244,434 | 37.5 | 6,527 | .7 |

* 1934 Estimate by Rand McNally and Company. (1900 Per Cent of Population in Pennsylvania 10.4 in U.S. 1.2)

** Estimate by Pennsylvania State Planning Board. (1930 Per Cent of Population in Pennsylvania 6.8 in U.S. .7)

## TABLE II - A

## POPULATION CLASSIFICATION OF WEST BRANCH SUSQUEHANNA BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934, ** Population | ESTIMATED 1934, ** Per Cent of Total Basin | ESTIMATED 1934, ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100,000 or Over | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 50,000 to 100,000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 25,000 to 50,000 | 1 | 28,760 | 8.9 | 45,729 | 12.6 | 17.0 | 44,018 | 11.6 | 15.9 | 16,969 | 59.0 | 1,711- | 3.9- |
| 10,000 to 25,000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5,000 to 10,000 | 6 | 29,170 | 9.0 | 46,713 | 12.9 | 17.4 | 47,738 | 12.6 | 17.3 | 17,543 | 60.1 | 1,025 | 2.2 |
| 2,500 to 5,000 | 14 | 32,072 | 9.9 | 49,727 | 13.8 | 18.5 | 53,883 | 14.2 | 19.5 | 17,655 | 55.0 | 4,156 | 8.4 |
| 2,500 Under | 57 | 43,458 | 13.3 | 46,514 | 12.9 | 17.4 | 50,838 | 13.5 | 18.5 | 3,056 | 7.0 | 4,324 | 9.3 |
| TOTAL CITIES & BOROS | 78 | 133,460 | 41.1 | 188,683 | 52.2 | 70.3 | 196,477 | 51.9 | 71.2 | 55,223 | 41.4 | 7,794 | 4.1 |
| TOWNSHIPS | - | 191,351 | 58.9 | 172,531 | 47.8 | - | 182,258 | 48.1 | - | 18,820- | 10.9- | 9,727 | 5.6 |
| Unincorporated Villages | - | - | - | *79,597 | 22.0 | 29.7 | *79,597 | 21.0 | 28.8 | - | - | - | - |
| Scattered | - | - | - | 92,934 | 25.8 | - | 102,661 | 27.1 | - | - | - | 9,727 | 10.5 |
| TOTAL Population Residing in Communities | - | - | - | 268,280 | 74.2 | 100.0 | 276,074 | 72.9 | 100.0 | - | - | 7,794 | 2.9 |
| GRAND TOTAL WEST BRANCH SUB-BASIN | - | 324,811 | 100.0 | 361,214 | 100.0 | - | 378,735 | 100.0 | - | 36,403 | 11.2 | 17,521 | 4.9 |

* 1934 Estimate by Rand McNally and Company. (1900 Per Cent Population of Pennsylvania 5.2 - of U. S. .4)
** Estimate by Pennsylvania State Planning Board. (1930 Per Cent Population of Pennsylvania 3.8 - of U. S. .3)

TABLE II - B

POPULATION CLASSIFICATION OF JUNIATA BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934 ** Population | ESTIMATED 1934 ** Per Cent of Total Basin | ESTIMATED 1934 ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100,000 or Over | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 50,000 to 100,000 | 1 | 38,970 | 19.1 | 82,054 | 29.5 | 41.5 | 79,843 | 26.3 | 38.8 | 43,084 | 110.6 | 2,211- | -2.8 |
| 25,000 to 50,000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10,000 to 25,000 | 1 | 4,450 | 2.1 | 13,357 | 4.8 | 6.8 | 19,294 | 6.3 | 9.4 | 8,907 | 200.2 | 5,937 | 44.4 |
| 5,000 to 10,000 | 3 | 14,900 | 7.1 | 22,569 | 8.1 | 11.4 | 22,487 | 7.4 | 10.9 | 7,669 | 51.5 | 82- | -.4 |
| 2,500 to 5,000 | 5 | 6,170 | 3.0 | 16,218 | 5.8 | 8.1 | 17,237 | 5.6 | 8.5 | 10,048 | 162.9 | 1,019 | 6.3 |
| Under 2,500 | 40 | 18,880 | 9.1 | 21,413 | 7.8 | 10.8 | 24,575 | 8.1 | 11.9 | 2,533 | 13.4 | 3,162 | 14.8 |
| TOTAL CITIES & BOROS | 50 | 83,370 | 40.4 | 155,611 | 56.0 | 78.6 | 163,436 | 53.7 | 79.5 | 72,241 | 86.7 | 7,825 | 5.0 |
| TOWNSHIPS | | 123,087 | 59.6 | 122,451 | 44.0 | - | 140,645 | 46.3 | - | 636- | -.5 | 16,194 | 14.9 |
| Unincorporated Towns and Villages | | | | *42,260 | 15.2 | 21.4 | *42,260 | 13.9 | 20.5 | - | - | - | - |
| Scattered | | | | 80,191 | 28.8 | - | 98,385 | 32.4 | - | - | - | 18,194 | 22.7 |
| TOTAL Population Residing in Communities | | | | 197,871 | 71.2 | 100.0 | 205,696 | 67.6 | 100.0 | - | - | 7,825 | 4.0 |
| GRAND TOTAL JUNIATA BASIN | | 206,457 | 100.0 | 278,062 | 100.0 | - | 304,081 | 100.0 | - | 71,605 | 34.7 | 26,019 | 9.4 |

* 1934 Estimate by Rand McNally and Company. (1900 Per Cent of Population in Pennsylvania 3.3 of U. S. .3)

**Estimate by Pennsylvania State Planning Board. (1930 Per Cent of Population in Pennsylvania 2.9 of U. S. .2)

# TABLE II - C

## POPULATION CLASSIFICATION OF LOWER BRANCH SUSQUEHANNA

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934 ** Population | ESTIMATED 1934 ** Per Cent of Total Basin | ESTIMATED 1934 ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 100,000 or Over | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 50,000 to 100,000 | 3 | 125,340 | 17.5 | 195,542 | 20.9 | 28.8 | 202,110 | 20.7 | 28.9 | 70,202 | 56.0 | 6,568 | 3.4 |
| 25,000 to 50,000 | 1 | 17,630 | 2.5 | 25,561 | 2.7 | 3.8 | 25,690 | 2.6 | 3.7 | 7,931 | 45.0 | 129 | .5 |
| 10,000 to 25,000 | 9 | 104,414 | 14.5 | 139,474 | 14.9 | 20.6 | 139,427 | 14.3 | 20.0 | 25,060 | 21.9 | 47- | -.03 |
| 5,000 to 10,000 | 7 | 19,515 | 2.7 | 42,714 | 4.6 | 6.3 | 45,228 | 4.6 | 6.5 | 23,199 | 118.9 | 2,514 | 5.9 |
| 2,500 to 5,000 | 19 | 36,122 | 5.0 | 70,560 | 7.5 | 10.4 | 74,667 | 7.7 | 10.7 | 34,438 | 95.3 | 4,107 | 5.8 |
| Under 2,500 | 95 | 59,141 | 8.2 | 83,054 | 8.8 | 12.2 | 90,099 | 9.3 | 12.8 | 23,913 | 40.4 | 7,045 | 8.5 |
| TOTAL CITIES & BOROS | 134 | 362,162 | 50.4 | 556,905 | 59.4 | 82.1 | 577,221 | 59.2 | 82.6 | 194,743 | 53.8 | 20,316 | 3.6 |
| TOWNSHIPS | | 355,985 | 49.6 | 380,665 | 40.6 | - | 398,045 | 40.8 | - | 24,680 | 6.9 | 17,380 | 4.6 |
| Unincorporated Towns & Villages | | - | - | *121,591 | 13.0 | 17.9 | *121,591 | 12.5 | 17.4 | - | - | - | - |
| Scattered | | - | - | 259,074 | 27.6 | - | 276,454 | 28.3 | - | - | - | 17,380 | 6.7 |
| TOTAL Population Residing in Communities | | | | 678,496 | 72.4 | 100.0 | 698,812 | 71.7 | 100.0 | | | 20,316 | 3.0 |
| GRAND TOTAL LOWER BRANCH SUSQUEHANNA BASIN | | 718,147 | 100.0 | 937,570 | 100.0 | - | 975,266 | 100.0 | - | 219,423 | 30.6 | 37,696 | 4.0 |

* 1934 Estimate by Rand McNally and Company

** Estimate by Pennsylvania State Planning Board.

(1900 Per Cent Population of Pennsylvania 71.4 of U.S. .9)

(1930 Per Cent Population of Pennsylvania 9.7 of U.S. .8)

TABLE III

CLASSIFICATION OF CITIES AND BOROUGHS IN NORTH BRANCH SUSQUEHANNA SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 100,000 & over (1) | | 143,432 | 40.6 | |
| Scranton | Lackawanna | 143,432 | 40.6 | T, M & (M) |
| 50,000 to 100,000 (1) | | 86,626 | 53.4 | |
| Wilkes-Barre | Luzerne | 86,626 | 53.4 | M & (M) |
| 25,000 to 50,000 (1) | | 26,043 | 115.0 | |
| Nanticoke | Luzerne | 26,043 | 115.0 | (M) |
| 10,000 to 25,000 (10) | | 157,964 | 82.0 | |
| Berwick | Columbia | 12,660 | 223.3 | M |
| Carbondale | Lackawanna | 20,061 | 30.4 | (M) |
| Dickson City | " | 12,395 | 150.5 | M & (M) |
| Dunmore | " | 22,627 | 79.8 | T, M & (M) |
| Old Forge | " | 12,661 | 124.9 | M & (M) |
| Olyphant | " | 10,743 | 73.8 | M & (M) |
| Taylor | " | 10,428 | 144.8 | M & (M) |
| Kingston | Luzerne | 21,600 | 45.3 | T, M & (M) |
| Pittston | " | 18,246 | 256.6 | T, M & (M) |
| Plymouth | " | 16,543 | 42.7 | T, M & (M) |
| 5,000 to 10,000 (20) | | 151,217 | 105.7 | |
| Sayre | Bradford | 7,902 | 50.7 | T, A & (M) |
| Bloomsburg | Columbia | 9,093 | 47.4 | M |
| Archbald | Lackawanna | 9,587 | 77.7 | M & (M) |
| Blakely | " | 8,260 | 111.0 | M & (M) |
| Throop | " | 8,027 | 264.2 | M & (M) |
| Winton | " | 8,508 | 148.4 | M & (M) |
| Ashley | Luzerne | 7,093 | 75.3 | T & (M) |
| Dupont | " | 5,161 | non-existing | M & (M) |
| Duryea | " | 8,503 | 53.5 | M & (M) |
| Edwardsville | " | 8,847 | 21.3 | M & (M) |
| Exeter | " | 5,724 | 193.8 | (M) |
| Forty Fort | " | 6,224 | 299.7 | (M) |
| Larksville | " | 9,322 | non-existing | M & (M) |
| Luzerne | " | 6,950 | 82.1 | A, M & (M) |
| Swoyersville | " | 9,133 | 303.4 | M & (M) |
| West Hazleton | " | 7,310 | 190.5 | M & (M) |
| West Pittston | " | 7,940 | 35.8 | M & (M) |
| Danville | Montour | 7,185 | -10.7 | M & (M) |
| McAdoo | Schuylkill | 5,239 | 146.9 | T & (M) |
| Forest City | Susquehanna | 5,209 | 21.7 | T & (M) |

TABLE III (Cont'd)

CLASSIFICATION OF CITIES AND BOROUGHS IN NORTH BRANCH SUSQUEHANNA SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of industry |
|---|---|---|---|---|
| 2,500 to 5,000 (11) | | 41,261 | 53.1 | |
| Athens | Bradford | 4,372 | 16.6 | A & M |
| Towanda | " | 4,104 | -12.0 | A & M |
| Clarks Summit | Lackawanna | 2,604 | non-existing | M |
| Jermyn | " | 3,519 | 37.1 | T & M |
| Mayfield | " | 3,774 | 64.1 | T & (M) |
| Moosic | " | 4,557 | 271.4 | M |
| Avoca | Luzerne | 4,943 | 41.8 | T, M & (M) |
| Sugar Notch | " | 2,768 | 46.7 | M & (M) |
| West Wyoming | " | 2,769 | 108.0 | M & (M) |
| Wyoming | " | 4,648 | 143.5 | (M) |
| Susquehanna Depot | Susquehanna | 3,203 | -16.0 | T & A |
| Under 2,500 (55) | | 53,123 | 15.8 | |
| Total Cities & Boros in N. Branch Susquehanna Sub-Basin (99) | | 659,666 | 65.3 | |

* T - Transportation M - Manufacturing A - Agriculture (M) - Mining

TABLE III-A

CLASSIFICATION OF CITIES AND BOROUGHS IN WEST BRANCH SUSQUEHANNA SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 100,000 and over (none) | | | | |
| 50,000 to 100,000 (1) | | 45,729 | 59.0 | |
| Williamsport | Lycoming | 45,729 | 59.0 | T & M |
| 25,000 to 50,000 (none) | | | | |
| 10,000 to 25,000 (none) | | | | |
| 5,000 to 10,000 (6) | | 46,713 | 60.1 | |
| Clearfield | Clearfield | 9,221 | 81.5 | A & M |
| Lock Haven | Clinton | 9,668 | 34.1 | T & M |
| St. Mary's | Elk | 7,433 | 73.1 | T & M |
| Jersey Shore | Lycoming | 5,781 | 88.3 | M |
| South Williamsport | " | 6,058 | 82.0 | M |
| Milton | Northumberland | 8,552 | 38.5 | M |
| 2,500 to 5,000 (14) | | 49,727 | 55.0 | |
| Barnesboro | Cambria | 3,506 | 136.6 | (M) |
| Gallitzin | Cambria | 3,458 | 25.3 | (M) |
| Patton | Cambria | 2,988 | 12.7 | (M) |
| Spangler | Cambria | 2,761 | 70.8 | (M) |
| Emporium | Cameron | 2,929 | 18.9 | M |
| Bellefonte | Centre | 4,804 | 14.0 | T & M |
| Phillipsburg | " | 3,600 | 10.2 | M |
| State College | " | 4,450 | 422.9 | Education Center |
| Curwensville | Clearfield | 3,140 | 62.1 | A |
| Renovo | Clinton | 3,947 | -3.3 | M |
| Montoursville | Lycoming | 2,710 | 62.8 | M |
| Northumberland | Northumberland | 4,483 | 63.1 | M |
| Wellsboro | Tioga | 3,643 | 23.3 | M |
| Lewisburg | Union | 3,308 | -4.3 | M |
| Under 2,500 (57) | | 46,514 | 7.0 | |
| Total Cities and Boros in W. Branch Susquehanna Sub-Basin (78) | | 188,683 | 41.4 | |

* T - Transportation M - Manufacturing A - Agriculture (M) - Mining.

TABLE III-B

CLASSIFICATION OF CITIES AND BOROUGHS IN JUNIATA SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 100,000 and over (none) | | | | |
| 50,000 to 100,000 (1) | | 82,054 | 110.6 | |
| Altoona | Blair | 82,054 | 110.6 | T, M & (M) |
| 25,000 to 50,000(none) | | | | |
| 10,000 to 25,000 (1) | | 13,357 | 200.2 | |
| Lewistown | Mifflin | 13,357 | 200.2 | M |
| 5,000 to 10,000 (3) | | 22,569 | 51.5 | |
| Hollidaysburg | Blair | 5,969 | 56.8 | T & M |
| Tyrone | Blair | 9,042 | 54.6 | T & M |
| Huntingdon | Huntingdon | 7,558 | 24.9 | T & M |
| 2,500 to 5,000 (5) | | 16,218 | 162.9 | |
| Bedford | Bedford | 2,953 | 36.3 | M |
| Bellwood | Blair | 2,560 | 65.7 | A |
| Roaring Spring | " | 2,724 | 102.7 | M |
| Mount Union | Huntingdon | 4,892 | 350.5 | M |
| Burnham | Mifflin | 3,089 | Inc. in Derry Twp | M |
| Under 2,500 (40) | | 21,413 | 13.4 | |
| Total Cities and Boros in Juniata Sub-Basin (50) | | 155,611 | 86.7 | |

* T - Transportation M - Manufacturing A - Agriculture (M) Mining

TABLE III-C

CLASSIFICATION OF CITIES AND BOROUGHS IN MAIN SUSQUEHANNA SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 100,000 and over (none) | | | | |
| 50,000 to 100,000 (3) | | 195,542 | 56.0 | |
| Harrisburg | Dauphin | 80,339 | 60.1 | T & M |
| Lancaster | Lancaster | 59,949 | 52.3 | A & M |
| York | York | 55,254 | 63.9 | T & M |
| 25,000 to 50,000 (1) | | 25,561 | 45.0 | |
| Lebanon | Lebanon | 25,561 | 45.0 | T & M |
| 10,000 to 25,000 (9) | | 139,474 | 21.9 | |
| Carlisle | Cumberland | 12,596 | 30.9 | M |
| Steelton | Dauphin | 13,291 | 10.0 | M |
| Columbia | Lancaster | 11,349 | -7.9 | T & M |
| Sunbury | Northumberland | 15,626 | 59.3 | M |
| Mt. Carmel | " | 17,967 | 36.3 | M & (M) |
| Shamokin | " | 20,274 | 11.4 | M & (M) |
| Mahanoy City | Schuylkill | 14,784 | 5.5 | M & (M) |
| Shenandoah | " | 21,782 | 7.2 | M & (M) |
| Hanover | York | 11,805 | 122.7 | M |
| 5,000 to 10,000 (7) | | 42,714 | 118.9 | |
| Mechanicsburg | Cumberland | 5,647 | 47.0 | M |
| New Cumberland | " | 4,283 | 24.2 | M |
| Middletown | Dauphin | 6,085 | 8.5 | T & M |
| Kulpmont | Northumberland | 6,120 | non-existing | (M) |
| Ashland | Schuylkill | 7,164 | 11.3 | M & (M) |
| Frackville | " | 8,034 | 209.7 | M & (M) |
| West York | York | 5,381 | non-existing | M |

TABLE III-C (Cont'd)

CLASSIFICATION OF CITIES AND BOROUGHS IN LOWER SUSQUEHANNA SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 2,500 to 5,000 | (19) | 70,560 | 95.3 | |
| Camp Hill | Cumberland | 3,111 | 764.2 | Residential |
| Lemoyne | " | 4,171 | non-existing | Residential |
| Shippensburg | " | 4,345 | 21.3 | M |
| Hummelstown | Dauphin | 3,036 | 75.6 | M |
| Lykens | " | 3,033 | 9.8 | (M) |
| Millersburg | " | 2,909 | 73.7 | M |
| Penbrook | " | 3,567 | 312.8 | M |
| Williamstown | " | 2,958 | .8 | M & (M) |
| Elizabethtown | Lancaster | 3,940 | 167.5 | A & M |
| Ephrata | " | 4,988 | 103.5 | A & M |
| Lititz | " | 4,368 | 166.8 | A & M |
| Manheim | " | 3,520 | 74.3 | A & M |
| Mount Joy | " | 2,716 | 34.6 | A & M |
| Palmyra | Lebanon | 4,377 | non-existing | A & M |
| Gilberton | Schuylkill | 4,227 | -3.3 | (M) |
| Girardville | " | 4,891 | 33.4 | (M) |
| Selinsgrove | Snyder | 2,797 | 110.9 | A & M |
| Dallastown | York | 2,849 | 141.2 | A & M |
| Red Lion | " | 4,757 | 255.8 | A & M |
| Under 2,500 | (95) | 83,054 | 40.4 | |
| Total Cities & Boros in Main Susquehanna Sub-Basin (134) | | 566,905 | 53.8 | |

* T - Transportation M - Manufacturing A - Agriculture (M) - Mining

(b) Rural Development:---

1. Agricultural: 4 /

North Branch Sub-Basin: - The northern part of this sub-basin lies in the Northeastern Dairy Region of Pennsylvania. The farm lands are largely classed as below average or submarginal and contain small areas of forest land in the northern part and some larger ones in the central and southern part. The southwestern part lies in the North Branch Diversified Farming Region, and contains the best agricultural lands of the sub-basin, which are classified as average or above average. Limited areas of these average farm lands exist in the southeastern portion which includes the upper anthracite coal mining region. Table IV shows trends in agricultural development during the past thirty-five years for counties mainly within the sub-basin. The trend has been downward from 1900 to 1930 but shows a slight reversal in the last five years. It is believed, however, that this reversal of trend is a temporary interruption accountable to the depression. This recent trend is probably due to the fact that land formerly abandoned as incapable of producing an adequate return is now being occupied by persons forced to leave the urban centers by depressed industrial conditions.

There are large areas of submarginal farm land in the northern part of the sub-basin which are largely used as pasture. Due to the depletion of forests in this area, it would seem desirable to utilize land withdrawn from agricultural use for forest purposes. This change in use would ultimately benefit the forest industries.

West Branch Sub-Basin: - The northwestern portion of the sub-basin lies in the Allegheny mountains and for the most part is covered with forests. This section comprises some of the least developed lands in the State. The cleared land is practically all submarginal and sparsely popu-

4 / Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pennsylvania December 1934. Page 106.

lated. The extreme northern portion lies in the Potter County Potato and Dairy and Northeastern Dairy Areas and contains few areas of average farm land. The southwestern, southcentral and southeastern parts lie in the Allegheny Plateau General Farming, the Appalachian Valley Dairy and West Branch Diversified Farming areas respectively. These sections contain the best agricultural lands in the sub-basin although the areas of above average farm land are small. The ridges and high areas in this section are forested. Table V shows agricultural statistics for counties mainly within the sub-basin.

The trend in agricultural development indicates a decrease in the number of farms and area of farm land. This is in line with improved agricultural production methods and the consequent decrease in needed acreage and manpower.

Juniata Sub-Basin: - The northwestern part of the sub-basin lies in the Bedford-Bellefonte Appalachian Valleys Dairy Region and the central part in the Appalachian Diversified Farming Region. The entire sub-basin area lies in the Appalachian Ridge and Valley section of Pennsylvania. This area is composed of narrow wooded ridges and cleared valleys. Some of the valleys contain good farm land but the major portion is classified as below average and submarginal. Table VI shows agricultural trends for counties mainly within the sub-basin.

There has been a decrease in the number of farms from 1900 to 1930 but an increase since 1930. This increase was greater in the number of farms than in the acreage in farm land, indicative of a reduction in size of the average farm. The large areas of sub-marginal farm land in the southern portion of the sub-basin could probably be well utilized for reforestation purposes.

Lower Susquehanna Sub-Basin: - The upper portion of this sub-basin is located in the Diversified Farming Region. In the lower portion the raising of poultry, dairy products, fruit and canning crops is important.

In Lancaster County, tobacco raising predominates. This sub-basin contains the best agricultural lands in the entire State and has few areas of below average farm land. In the upper and western portions are found wooded ridges and fertile valleys while the lower portion, located in the Piedmont Plateau Region, contains scattered areas of forest land. Table VII contains agricultural statistics for counties mainly within the sub-basin.

The trend in agricultural development of the basin is similar to that of the Juniata Sub-Basin. Due to the proximity of large market areas at Philadelphia and Baltimore and to the physical features of the land, the future of agriculture in the basin appears to be promising.

2. Industrial (decentralized).

North Branch Sub-Basin: - The major decentralized industries include the production of anthracite and bituminous coal, stone, leather, textiles and food products.

West Branch Sub-Basin: - The major industries of this sub-basin include the production of bituminous and semi-anthracite coal, clay products, lime, leather and food products. The Pennsylvania Railroad has extensive car repair shops at Renovo.

Juniata Sub-Basin: - The production of bituminous coal, clay, glass sand, lime, stone, food products, leather and textiles are the major industries of this sub-basin. Large car repair shops are located at Altoona.

Lower Susquehanna Sub-Basin: - The major industries of the sub-basin include the production of anthracite coal, tobacco, food products, textiles, paper and steel.

3. Mining (including petroleum).

North Branch Sub-Basin: - The anthracite coal mining industry is concentrated in Columbia, Lackawanna, Luzerne, and Susquehanna counties. In 1933 there were 150 operating mines in this area which produced 63 percent of the total anthracite coal mined in the State.

Tioga and Bradford counties contain limited beds of bituminous coal which is especially adapted for use in forges. In 1933 there were 12 operating mines in the sub-basin which produced a total of 188,077 tons or 0.2 percent of the coal sold in the State.

Natural gas was first discovered in Tioga County in 1930. In 1932 the area produced 500,000,000 cubic feet daily. The gas is piped to Williamsport, Pa., and Syracuse, N. Y.

West Branch Sub-Basin: - The southwestern portion contains extensive deposits of low volatile bituminous coal which is ideal for bunker fuel. Cambria and Clearfield counties contain the largest deposits. Table VIII lists mining statistics for counties lying mainly within the Susquehanna Drainage Basin.

The western border of the sub-basin is adjacent to the natural gas field, and although there are some gas wells located in the sub-basin, the production of natural gas is relatively unimportant.

Juniata Sub-Basin: - In this sub-basin, the bituminous coal mining industry is located mainly in Bedford, Blair and Huntingdon counties. The coal mined is of the low-volatile type. In 1933 these counties contained 37 active mining operations which produced slightly more than 950,000 tons or 1.2 percent of the coal sold in Pennsylvania.

Lower Susquehanna Sub-Basin: - The northern portion of the sub-basin is located in the Anthracite Region. In 1933 there were 101 active

mines which produced 15,251,854 tons of coal or nearly 33 percent of the anthracite production of the entire State.

4. Lumbering: -

The lumbering industry reached its peak in Pennsylvania in 1900 and has been declining since that year, until, at the present time it is relatively unimportant. Most of the existing forest growth is second growth timber, some of which may be of value in the future.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies Under Sections (a) and (b).

1. Cities and Towns: - The population of the cities and boros has increased rapidly in all the sub-basins from 1900 to 1930, the percentage of increase has been largest in the Juniata Sub-Basin (86.7%), and lowest in the West Branch Sub-Basin (41.4%). From 1930 to 1934, the cities and boros continued to increase in population for all sub-basins with the exception of the North Branch where there was a slight decline.

With the exception of the Lower Susquehanna Sub-Basin, the population of townships decreased during the period from 1900 to 1930. During the period 1930 to 1934, the population of townships increased in all the sub-basins. This reversal of trend is thought to be a temporary condition, caused by the industrial depression, and is not expected to continue in the future.

2. Agriculture: - Trends in the agricultural development of the sub-basins indicate a dropping off in the number and area of farms from 1900 to 1930. From 1930 to 1935, there has been a reversal in trend, with the number of farms and amount of farm land increasing in all sub-basins.

In 1900 there were 89,591 farms with a total of 8,128,729 acres in the Susquehanna Basin in Pennsylvania; in 1930 the number of farms decreased to 73,859 and the acreage to 6,859,587. In 1935 the number of farms increased to 77,628 with a total acreage of 6,949,336.

TABLE IV

Number of Farms and the Amount of Land in Farms for Counties

Located Mainly in the North Branch Sub-Basin in Pennsylvania

| Year | No. of Farms | Land in Farms (Acres) | Per Cent of Total Area | Per Cent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 25,845 | 2,394,394 | 72.2 | 12.7 |
| 1910 | 23,940 | 2,371,938 | 69.5 | 12.7 |
| 1920 | 21,327 | 2,239,871 | 65.7 | 12.7 |
| 1925 | 21,097 | 2,104,271 | 61.7 | 12.9 |
| 1930 | 18,578 | 2,021,153 | 59.2 | 13.2 |
| 1935 | 19,761 | 2,058,644 | 60.3 | 13.0 |

Source:---Census of Agriculture -- U. S. Department of Commerce.

TABLE V

Number of Farms and the Amount of Land in Farms for Counties

Located Mainly in the West Branch Sub-Basin in Pennsylvania

| Year | No. of Farms | Land in Farms (Acres) | Per Cent of Total Area | Per Cent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 17,098 | 1,682,924 | 39.0 | 8.7 |
| 1910 | 17,225 | 1,622,255 | 37.6 | 8.7 |
| 1920 | 14,903 | 1,514,387 | 35.1 | 8.6 |
| 1925 | 15,039 | 1,405,971 | 32.6 | 8.6 |
| 1930 | 12,571 | 1,342,543 | 31.1 | 8.8 |
| 1935 | 13,938 | 1,363,717 | 31.6 | 8.6 |

Source:---Census of Agriculture -- U. S. Department of Commerce.

TABLE VI

Number of Farms and the Amount of Land in Farms for Counties

Located Mainly in the Juniata Sub-Basin in Pennsylvania

| Year | No. of Farms | Land in Farms (Acres) | Per Cent of Total Area | Per Cent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 10,570 | 1,383,061 | 66.1 | 7.1 |
| 1910 | 10,748 | 1,299,823 | 62.1 | 7.0 |
| 1920 | 9,879 | 1,250,229 | 59.8 | 7.1 |
| 1925 | 9,993 | 1,173,652 | 56.1 | 7.2 |
| 1930 | 8,989 | 1,110,874 | 53.1 | 7.3 |
| 1935 | 9,735 | 1,120,432 | 53.6 | 7.1 |

Source:---Census of Agriculture -- U. S. Department of Commerce.

TABLE VII

Number of Farms and the Amount of Land in Farms for Counties

Located Mainly in the Lower Susquehanna Sub-Basin in Pennsylvania

| Year | No. of Farms | Land in Farms (Acres) | Per Cent of Total Area | Per Cent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 36,078 | 2,668,350 | 81.6 | 13.8 |
| 1910 | 38,087 | 2,629,227 | 80.4 | 14.1 |
| 1920 | 37,027 | 2,585,942 | 79.1 | 14.6 |
| 1925 | 37,245 | 2,429,297 | 74.3 | 14.9 |
| 1930 | 33,721 | 2,385,017 | 72.9 | 15.6 |
| 1935 | 34,194 | 2,406,543 | 73.6 | 15.2 |

Source:---Census of Agriculture -- U. S. Department of Commerce.

It is believed that much of the land which has been returned to farming purposes since 1930 will be retired from farming when industrial conditions improve.

3. <u>Industry</u>: - Both the anthracite and bituminous coal industries have been declining for a number of years. High production and distribution costs together with competition from other types of fuel have been responsible for a portion of this decline. However, the installation of more efficient boilers and equipment by industries, and the substitution of transportation by truck for that of rail facilities have decreased the market for coal.

Industries of widely diversified products have been established in most of the cities and boros of the lower section of the Susquehanna Basin. These industries, stragetically located close to markets and fuel, and served by adequate transportation facilities, will probably continue to thrive in the future.

In the Anthracite Coal Region, the decline of mining has thrown large numbers of people out of employment, so that it is probable that new industries will be established in this area to take advantage of the available supply of workers. In the bituminous coal districts, overproduction and competition within the mining industry has created a surplus of available workers. It is not believed that this supply of available workers will attract many industries to this area, however, for it is not so well located with respect to markets and transportation facilities as the eastern portion of the Basin.

The West Branch Sub-Basin is not highly developed for industrial purposes with the exception of the Williamsport and Lock Haven areas lying along the southern portion of the river. Although the industrial

development of these two areas is expected to continue, the present trends would seem to indicate that little industrial development is to be expected in the remainder of the West Branch Sub-Basin.

(d) Transportation Facilities:-

1. Waterways: - There is no system of waterway transportation serving the Susquehanna Basin.

2. Highways: - The entire Basin is served by a system of paved highways which connect the population centers.

3. Railroads: - In the North Branch Sub-Basin, the Pennsylvania, Lehigh Valley, Lackawanna and Reading railroads connect the principal centers and, in general, parallel the main streams. The New York Central, Pennsylvania and Reading railroads traverse the West Branch Sub-Basin. The Pennsylvania Railroad traverses the Juniata Sub-Basin, paralleling the Juniata River from its mouth to Cresson whence it crosses the divide. In the Lower Susquehanna Sub-Basin, the Pennsylvania and Reading railroads connect the main population centers.

4. Airports: - The United States Department of Commerce, Airway Bulletin Number 2, September 1, 1934 lists 26 airports in the Susquehanna Basin in Pennsylvania; seven of these are located in the North Branch Sub-Basin, six in the West Branch Sub-Basin, four in the Juniata Sub-Basin and nine in the Lower Susquehanna Sub-Basin.

TABLE VIII

ANTHRACITE MINING -- SUSQUEHANNA BASIN

(For counties Mainly within the Basin)

| County | No. of Companies | No. of Operations | No. of Employees | 1933 - Production Sold - Tons | Percent of total State Production |
|---|---|---|---|---|---|
| | | North Branch Sub-Basin | | | |
| Columbia | 6 | 7 | 1,009 | 502,196 | |
| Lackawanna | 75 | 124 | 21,438 | 10,442,883 | |
| Luzerne | 67 | 118 | 44,450 | 18,254,507 | |
| Susquehanna | 2 | 2 | 329 | 119,463 | |
| Total | 150 | 251 | 67,226 | 29,319,049 | 63.0 |
| | | West Branch Sub-Basin | | | |
| Sullivan | 5 | 5 | 718 | 108,974 | |
| Total | 5 | 5 | 718 | 108,974 | .2 |
| | | Lower Susquehanna Sub-Basin | | | |
| Dauphin | 1 | 4 | 1,285 | 574,084 | |
| Northumberland | 10 | 19 | 7,980 | 5,007,162 | |
| Schuylkill | 39 | 78 | 20,891 | 9,670,608 | |
| Total | 50 | 101 | 30,156 | 15,251,854 | 32.8 |
| Grand Total | 205 | 357 | 98,100 | 44,679,877 | 96.0 |

BITUMINOUS MINING -- SUSQUEHANNA BASIN

(For Counties Mainly within the Basin)

| County | No. of Companies | No. of Operations | No. of Employees | 1933 - Production Sold - Tons | Percent of total State Production |
|---|---|---|---|---|---|
| | | North Branch Sub-Basin | | | |
| Bradford | 1 | 1 | 17 | 6,360 | |
| Tioga | 8 | 11 | 531 | 181,717 | |
| Total | 9 | 12 | 548 | 188,077 | .2 |
| | | West Branch Sub-Basin | | | |
| Clearfield | 66 | 73 | 5,154 | 2,707,442 | |
| Clinton | 3 | 4 | 73 | 25,426 | |
| Centre | 20 | 23 | 1,052 | 534,863 | |
| Lycoming | 3 | 3 | 99 | 35,532 | |
| Total | 92 | 103 | 6,378 | 3,303,263 | 4.3 |
| | | Juniata Sub-Basin | | | |
| Bedford | 12 | 16 | 771 | 205,610 | |
| Blair | 6 | 11 | 535 | 231,441 | |
| Huntingdon | 6 | 10 | 970 | 514,314 | |
| Total | 24 | 37 | 2,276 | 951,365 | 1.2 |
| Grand Total | 125 | 152 | 9,202 | 4,442,705 | 5.7 |

NORTH BRANCH SUB-BASIN

(a) North Branch Susquehanna River. Tributary to Susquehanna River.

1. Source:---Otsego Lake, Catskill Mountains, southeastern New York.

2. Course:---Southwesterly, entering Pennsylvania in Susquehanna County, returning to New York after forming a loop 16 miles long and flowing westerly; re-entering Pennsylvania near Sayre, Bradford County; thence southeasterly through Wyoming County to Pittston, Luzerne County; thence southwesterly, traversing Columbia, Montour and Northumberland counties, to join West Branch and form Susquehanna River.

3. Length:---Total three hundred and sixteen miles. From source to Pennsylvania-New York boundary above Sayre, 150.5 miles, thence to mouth 165.5 miles along stream.

4. Drainage Area:---Total 11,277 square miles. In Pennsylvania 5,007 square miles embracing portions of Potter, Tioga, Bradford, Carbon, Susquehanna, Wayne, Lackawanna, Wyoming, Sullivan, Lycoming, Columbia, Luzerne, Schuylkill, Montour and Northumberland counties. In Pennsylvania the stream flows through a mountainous region. Above Pittston the Basin is traversed with narrow, parallel ranges at right angles to the main course of stream; below Pittston, the stream is confined to a narrow main valley between ridges. The Basin abounds in swamps, lakes and ponds of glacial origin.

5. Discharge:---Gaging station at Danville, Pennsylvania.

Drainage area above station 11,220 square miles.

| | |
|---|---|
| Average Discharge (33 years) | 1.35 c.s.m. |
| Maximum Discharge (March 20, 1936) | 22.28 c.s.m. |
| Minimum Discharge (September 23, 25, 1900) | .074 c.s.m. |

[5/] Source for all except discharge data-Water Resources Inventory Report, Part III, Gazateer of Streams, Pennsylvania Water Supply Commission-Harrisburg, Pa. 1916. Discharge data:-Pennsylvania Department of Forests and Waters and U. S. Geological Survey-Harrisburg, Pa. "c.s.m." means cubic feet per second per square mile of Drainage Area.

(b) Chemung River. Tributary to North Branch Susquehanna River.

1. Source:---Formed by junction of Tioga and Cohocton rivers at Painted Post, N. Y.

2. Course:---Southeasterly into Bradford County to North Branch Susquehanna River two miles south of Athens.

3. Length:---Forty-four miles along stream.

4. Drainage Area:---Total 2,520 square miles, in Pennsylvania 831.9 square miles of broken hilly country rounded by glacial action. Shale and sandstone formations covered in many places by glacial drift, predominate. The channel is sinuous through a broad valley in glacial drift with steep banks of shale and sandstone rocks where the stream sweeps close to the foothills.

5. Discharge:---Gaging Station at Corning, N. Y.

Drainage area above station 2,010 square miles.

Maximum gage height (July 8, 1935) 20.1 feet.

Minimum gage height (September 2, 3, 1921) 1.8 feet. Records available from December 1909 to September 1936. Discharge not determined.

(c) Towanda Creek. Tributary to North Branch Susquehanna River.

1. Source:---In Union Township, southeastern Tioga County.

2. Course:---Northeasterly into Bradford County to North Branch Susquehanna River near Towanda.

3. Length:---Thirty-one miles along stream.

4. Drainage Area:---282.5 square miles of rough and hilly country with narrow agricultural valleys flanked with steep hills. Shale and sandstone formations predominate with deposits of bituminous coal.

5. Discharge:---Gaging Station near Monroeton, Pennsylvania.

Drainage area above station 214 square miles.

Average Discharge (18 years 1914-1916, 1920-1936) 1.34 c.s.m.

Maximum Discharge (November 16, 1926) 73.83 c.s.m.

Minimum Discharge (September 15, 17, 21, 22, 1932) .003 c.s.m.

(d) Wyalusing Creek. Tributary to North Branch Susquehanna River.

1. Source:---Formed by junction of Middle and East branches in Rush Township, western Susquehanna County.

2. Course:---Southwesterly to North Branch Susquehanna River at Wyalusing, Pennsylvania.

3. Length:---Sixteen and one-half miles along stream.

4. Drainage Area:---216.2 square miles of rough and hilly country with narrow valleys flanked with steep hills rounded by glacial action. Lakes and swamps abound in headwaters. The formations are shale and sandstone covered by deposits of glacial drift.

5. Discharge:---No data available.

(e) Tunkhannock Creek. Tributary to North Branch Susquehanna River.

1. Source:---In Jackson Township, eastern Susquehanna County.

2. Course:---Southwesterly into Wyoming County to North Branch Susquehanna River at Tunkhannock, Pennsylvania.

3. Length:---Thirty-seven miles along stream.

4. Drainage Area:---Contains 414.4 square miles of rough and hilly country within glaciated area containing many small lakes and swamps. The narrow main valley is flanked with steep high hills having alluvial flood plains.

5. Discharge:---Gaging Station at Dixon, Pennsylvania.

Drainage area above station 383 square miles.

Records available January 1914 to September 1936.

Average Discharge (18 years) 1.41 c.s.m.

Maximum Discharge (September 30, 1924) 49.87 c.s.m.

Minimum Discharge (August 12, 1930) .023 c.s.m.

(f) Lackawanna River. Tributary to North Branch Susquehanna River.

1. Source:---Formed by junction of East and West branches in Clifford Township, southeastern Susquehanna County, elevation 1,590.

2. Course:---Southeasterly into Wayne County, thence southwesterly through Lackawanna County into Luzerne County to North Branch of Susquehanna River near Pittston, Pennsylvania.

3. Length:---Forty miles along stream.

4. Drainage Area:---346.3 square miles of mountainous country. The main valley is bounded on the west by Bald Mountain and on the east by Moosic Mountain, the average width being 6 miles. The basin is located within the glaciated area and contains many swamps, small lakes and ponds.

5. Discharge:---No records available.

(g) Fishing Creek. Tributary to North Branch Susquehanna River.

1. Source:---Formed by junction of east and west branch in Sugar Loaf Township, northeastern Columbia County.

2. Course:---Southerly and southwesterly to North Branch Susquehanna River at Rupert, Pennsylvania.

3. Length:---Twenty-nine and one-half miles along stream.

4. Drainage Area:---377.7 square miles of rough and hilly country in Allegheny Mountain region. Shale and sandstone formations predominate with some limestone in lower basin. The main valley is narrow and flanked with high steep hills. The terminal moraine crosses the upper Basin where there are a few small lakes and ponds.

5. Discharge:---No records available.

(a) West Branch Susquehanna River. Tributary to Susquehanna River.

1. Source:---In Carroll Township, northwestern Cambria County, elevation 1,990.

2. Course:---Northerly into Clearfield County; thence northeasterly between Centre County on the southeast and Clearfield and Clinton Counties on the northwest into Clinton County; thence southeasterly by a circuitous route through Lycoming County, and southerly between Northumberland and Union Counties, to join North Branch at Northumberland to form the Susquehanna River.

3. Length:---Two hundred and twenty-eight miles along stream.

4. Drainage Area:---Contains 6,913 square miles of high table lands of Allegheny Plateau Region. A small portion in the northeast lies within the glaciated area. The headwaters lie in the rich bituminous coal area in Clearfield and Cambria counties. From Clearfield to Lock Haven the country is rough and rugged with well wooded hills. From Lock Haven to the mouth of the stream the main valley is well populated. The agricultural valleys are flanked with rugged mountains covered with second growth timber.

5. Discharge:---Gaging Station at Williamsport, Pennsylvania.

Drainage area above station, 5,682 square miles.

Records available March 1895 to September 1936.

| | |
|---|---|
| Average Discharge (41 years) | 1.56 c.s.m. |
| Maximum Discharge (March 18, 1936) | 46.46 c.s.m. |
| Minimum Discharge (September 12, 13, 1932) | .041 c.s.m. |

(b) Clearfield Creek. Tributary to West Branch Susquehanna River.

1. Source:---In Munster Township, eastern Cambria County, elevation 1,960.

2. Course:---Northeasterly into Clearfield County to West Branch Susquehanna River near Clearfield.

3. Length:---Sixty-two miles along stream.

4. Drainage Area:---Contains 396.4 square miles of the Allegheny Plateau region. The topography is rough and hilly with shale and sandstone formations containing large coal deposits.

5. Discharge:---Gaging Station at Dimeling, Pennsylvania.

Drainage area above station 371 square miles.

Records available October 1913 to September 1936.

| | |
|---|---|
| Average Discharge (23 years) | 1.55 c.s.m. |
| Maximum Discharge (March 18, 1936) | 101.35 c.s.m. |
| Minimum Discharge (October 9, 1926) | .016 c.s.m. |

(c) Moshannon Creek. Tributary to West Branch Susquehanna River.

1. Source:---In Snyder Township, northern Blair County.

2. Course:---Northeasterly forming Clearfield-Centre County boundary to West Branch Susquehanna River south west of Pine Glen.

3. Length:---Forty-six miles along stream.

4. Drainage Area:---Contains 288.1 square miles of rough and hilly country with narrow valleys flanked with steep hills. The formations are shale and sandstone and contain rich deposits of bituminous coal.

5. Discharge:---No records available.

(d) Sinnemahoning Creek. Tributary to West Branch Susquehanna River.

1. Source:---Formed by junction of Driftwood Branch and Bennett Branch, at Driftwood, southeastern Cameron County.

2. Course:---Southeasterly into Clinton County to West Branch Susquehanna River at Keating.

3. <u>Length</u>:---Sixteen miles along stream.

4. <u>Drainage Area</u>:---Contains 1032.7 square miles of rough and hilly country situated in Allegheny Plateau region. The narrow valleys are flanked with steep hills and are well wooded in the basin of the Driftwood branch. Formations are shale and sandstone containing some bituminous coal.

5. <u>Discharge</u>:---Gaging station on Driftwood branch at Sterling Run.

Drainage area above station, 281 square miles.

Records available September 1913 to September 1936.

| | |
|---|---|
| Average Discharge (17 years) | 1.57 c.s.m. |
| Maximum Discharge (March 17, 1936) | 101.07 c.s.m. |
| Minimum Discharge (September 7, 12 to 14, 1930) | .001 c.s.m. |

(e) Kettle Creek. Tributary to West Branch Susquehanna River.

1. <u>Source</u>:---In Elk Township, southwestern Tioga County.

2. <u>Course</u>:---Southwesterly through Potter County into Clinton County, thence southerly by a circuitous route to West Branch Susquehanna River at Westport, Pennsylvania.

3. <u>Length</u>:---Forty-one and one-half miles along stream.

4. <u>Drainage Area</u>:---Contains 239.5 square miles of rough and hilly country lying within the Allegheny Plateau. The narrow valleys are flanked with steep hills and are well wooded in upper basin. Shale and sandstone formations predominate with some coal.

5. <u>Discharge</u>:---No records available.

(f) Bald Eagle Creek. Tributary to West Branch Susquehanna River.

1. <u>Source</u>:---In Taylor Township, southwestern Centre County.

2. <u>Course</u>:---Northeasterly into Clinton County to West Branch Susquehanna River near Lock Haven.

3. Length:---Fifty-one miles along stream.

4. Drainage Area:---Contains 781.8 square miles lying in the Allegheny Mountain region; broad agricultural valley between Bald Eagle Ridge on southeast and Allegheny Front on northwest. The slopes are well wooded and carved with many mountain streams. Sandstone and limestone formations predominate. The limestone formations contain many springs.

5. Discharge:---Gaging station at Beach Creek Station, Pennsylvania.

Drainage area above station, 559 square miles.

Records available June 1910 to September 1936.

| | |
|---|---|
| Average Discharge (26 years) | 1.42 c.s.m. |
| Maximum Discharge (March 18, 1936) | 39.89 c.s.m. |
| Minimum Discharge (January 9, 1931) | .027 c.s.m. |

(g) Pine Creek. Tributary to West Branch Susquehanna River.

1. Source:---Formed by junction of Cushing Creek and Genesee Fork at West Pike, eastern central Potter County, elevation 1,450.

2. Course:---Easterly into Tioga County to junction of Marsh Creek; thence southerly into Lycoming County; thence southwesterly and southeasterly to West Branch Susquehanna River southwest of Jersey Shore, Pennsylvania.

3. Length:---Seventy-two miles along stream.

4. Drainage Area:---Contains 973.0 square miles of rough and hilly country with narrow valleys and well wooded steep hills lying within the Allegheny Plateau region. Formations are shale and sandstone containing bituminous coal deposits and some oil.

5. Discharge:---Gaging station at Cedar Run, Pennsylvania.

Drainage area above station 604 square miles.

Records available July 1918 to September 1936.

| | |
|---|---|
| Average Discharge (17 years) | 1.22 c.s.m. |
| Maximum Discharge (March 18, 1936) | 51.16 c.s.m. |
| Minimum Discharge (September 6, 1929) | .008 c.s.m. |

(h) Lycoming Creek. Tributary to West Branch Susquehanna River.

1. Source:---In Canton Township, southwestern Bradford County.

2. Course:---Southwesterly into Lycoming County to West Branch Susquehanna River at Williamsport, Pennsylvania.

3. Length:---Thirty-four and one-half miles along stream.

4. Drainage Area:---Contains 276.1 square miles of rough and hilly country with narrow valleys flanked with steep wooded hills. The upper basin lies in the glaciated region. In the lower course the valley widens and has bottom agricultural lands. The formations are shale and sandstone, containing bituminous coal deposits.

5. Discharge:---Gaging station near Trout Run, Pennsylvania.

Drainage area above station, 173 square miles.

Records available, December 1913 to September 1936.

| | |
|---|---|
| Average Discharge (19 years) | 1.50 c.s.m. |
| Maximum Discharge (March 18, 1936) | 98.27 c.s.m. |
| Minimum Discharge (September 27, 1936) | .018 c.s.m. |

(i) Loyalsock Creek. Tributary to West Branch Susquehanna River.

1. Source:---In Forkston Township, southwestern Wyoming County.

2. Course:---Westerly into Sullivan County at Forksville; thence southwesterly into Lycoming County to West Branch Susquehanna River at Montoursville, Pennsylvania.

3. Length:---Fifty-nine and one-half miles along stream.

4. Drainage Area:---Contains 492.8 square miles of rough and hilly

country, with narrow valleys flanked with high, steep, well wooded hills. The upper basin contains many small swamps and lakes. Geological formations are shale and sandstone, containing deposits of soft anthracite coal in headwaters.

5. Discharge:---Drainage station at Loyalsock, Pennsylvania.

Drainage area above station, 443 square miles.

Records available July 1925 to September 1936.

| | |
|---|---|
| Average Discharge (11 years) | 1.57 c.s.m. |
| Maximum Discharge (November 16,1926) | 76.75 c.s.m. |
| Minimum Discharge (September 18,19,22 to 25,1932) | .036 c.s.m. |

(j) Muncy Creek. Tributary to West Branch Susquehanna River.

1. Source:---In Davidson Township, southeastern Sullivan County.

2. Course:---Southwesterly into Lycoming County to West Branch Susquehanna River near Muncy, Pennsylvania.

3. Length:---Thirty-three miles along stream.

4. Drainage Area:---Contains 216.3 square miles of rough and hilly country. In the upper basin the valleys are narrow and flanked with steep hills. In the lower basin, below Picture Rocks, the main valley has broad agricultural lands. Shale and sandstone formations predominate, with some limestone near the mouth.

5. Discharge:---No records Available.

## JUNIATA SUB-BASIN

(a) Juniata River. Tributary to Susquehanna River.

1. Source:---Formed by junction of Raystown and Frankstown branches in Huntingdon County, 3.5 miles southeast of Huntingdon.

2. Course:---Easterly, by circuitous route to Susquehanna River at Juniata Bridge, elevation 334.

3. Length:---Eighty-six miles along stream.

4. Drainage Area:---Contains 3,426 square miles lying wholly within the Allegheny Mountain region. A series of parallel ridges lying in the northeasterly-southwesterly direction, traversing the basin, have rolling agricultural valleys below the steep slopes. The main valley is narrow, being made up of troughs between parallel ridges and gaps where the stream has cut through on its easterly course. The higher areas are shale and sandstone formations, the valleys being largely limestone areas.

5. Discharge:---Gaging station at Newport, Pennsylvania.

Drainage area above station 3,354 square miles.

Records available, March 1899 to September 1936.

| | |
|---|---|
| Average Discharge(35 years 1899 - 1905, 1907 - 1936) | 1.32 c.s.m. |
| Maximum Discharge (March 19, 1936) | 64.10 c.s.m. |
| Minimum Discharge (August 27, 1925) | .085 c.s.m. |

(b) Frankstown Branch. Tributary to Juniata River.

1. Source:---Formed by junction of Beaverdam Creek and Boiling Spring Run, in Greenfield Township, southern Blair County, elevation 1,164.

2. Course:---Northeasterly to Water Street, forming Blair-Huntingdon county boundary for 4 miles; thence southeasterly into Huntingdon County to Juniata River near Ardenheim. Pennsylvania.

3. Length:---Fifty-six and one-half miles along stream.

4. Drainage Area:---Contains 977.8 square miles lying within the Allegheny Mountain region. The main valley lies between well wooded ridges and through gaps and ranges with agriculture in bottom lands. Geological

formations are shale, sandstone and limestone; containing some iron ore. The upper basin is especially rich in limestone and contains numerous springs.

5. Discharge:---Gaging station at Williamsburg, Pennsylvania.

Drainage area above station, 291 square miles.

Records available October 1916 to September 1936.

| | |
|---|---|
| Average Discharge (17 years, 1919 - 1936) | 1.32 c.s.m. |
| Maximum Discharge (March 18, 1936) | 163.57 c.s.m. |
| Minimum Discharge (July 24, 1934) | .045 c.s.m. |

(c) Raystown Branch. Tributary to Juniata River.

1. Source:---Formed by junction of Deeters Run and Spicer Brook, in Juniata Township, Bedford County, elevation 1,178.

2. Course:---Easterly to Ray's Hill; thence northeasterly into Huntingdon County to Juniata River near Ardenheim, Pennsylvania.

3. Length:---One hundred and eight miles along stream.

4. Drainage Area:---Contains 1,012.1 square miles in Allegheny Mountain region. The main valley is narrow and flanked with high, steep hills which are well wooded. Shale, sandstone and limestone formations containing some coal and iron ore predominate.

5. Discharge:---Gaging station at Saxton, Pennsylvania.

Drainage area above station, 756 square miles.

Records available August 1911 to September 1936.

| | |
|---|---|
| Average Discharge (25 years) | 1.24 c.s.m. |
| Maximum Discharge (March 18, 1936) | 106.5 c.s.m. |
| Minimum Discharge (October 17-18, 1930) | .069 c.s.m. |

(d) Aughwick Creek. Tributary to Juniata River.

1. Source:---Formed by junction of Sideling Hill Creek and Little Aughwick Creek, near Maddensville, Springfield Township, southeastern Huntingdon County.

2. Course:---Northeasterly to Juniata River, 3 miles southeast of Mt. Union.

3. Length:---Twenty-four and one-half miles along stream.

4. Drainage Area:---Contains 327.0 square miles of mountainous country. The wide main basin is bordered by parallel ridges which are gapped in places by tributary streams. Formations are shale, sandstone and limestone containing bituminous coal deposits at headwaters of Sideling Hill Creek.

5. Discharge:---Drainage station near Orbisonia, Pennsylvania.

Drainage area above station, 174 square miles.

Records available January 1930 to September 1936.

| | |
|---|---|
| Maximum Discharge (March 18, 1936) | 99.43 c.s.m. |
| Minimum Discharge (September 25-27, 1932) | .022 c.s.m. |

(e) Tuscarora Creek. Tributary to Juniata River.

1. Source:---In Tell Township, southeastern Huntingdon County.

2. Course:---Northeasterly, into Juniata County, to Juniata River at Port Royal, Pennsylvania.

3. Length:---Forty-four miles along stream.

4. Drainage Area:---Contains 256.1 square miles of mountainous country with the broad main valley containing rolling agricultural land bounded by parallel ridges of the Allegheny Mountains, the slopes of which are well wooded. Geological formations are shale, sandstone and limestone.

5. Discharge:---Gaging station near Port Royal, Pennsylvania.

Drainage area above station, 214 square miles.

Records available August 1911 to September 1936.

| | |
|---|---|
| Average Discharge (25 years) | 1.23 c.s.m. |
| Maximum Discharge (March 18, 1936) | 67.29 c.s.m. (est.) |
| Minimum Discharge (August 31, September 4-6,14,18,1913 and September 21, 1914) | .0047 c.s.m. |

LOWER-SUSQUEHANNA SUB-BASIN

(a) Main Susquehanna River. Tributary to Chesapeake Bay.

1. Source:---Formed by junction of North and West branches at Northumberland, Northumberland County, Pennsylvania, elevation 430.

2. Course:---Southerly, to junction of Juniata River; thence southeasterly to Chesapeake Bay.

3. Length:---Total 128 miles. In Pennsylvania one hundred and twelve miles along stream.

4. Drainage Area:---Total 27,400 square miles. In Pennsylvania 20,917 square miles. The basin lies in three main geographic divisions of Pennsylvania: the northern portion in the well dissected Allegheny Plateau; the central portion in the rugged Allegheny Mountains; and the lower portion in the rolling Piedmont Plateau. Between Northumberland and Harrisburg the stream cuts through a series of parallel mountain ridges. The geological formations are extremely varied. The upper basin contains principally shale and sandstone outcrops. The eastern portion of the middle basin is rich in shale and sandstone, containing the noted anthracite deposit of the Wyoming Valley in the vicinity of Wilkes-Barre and Scranton, and the deposits in southern Luzerne, Carbon, Schuylkill and Northumberland counties;

while the western portion abounds in extensive limestone deposits in the valleys, containing some iron ore and many strong flowing springs. The lower basin has extensive limestone valleys. The formations of the higher areas are principally slate, sandstone and trap rock.

5. Discharge:---Gaging station at Harrisburg, Pennsylvania.

Drainage area above station, 24,100 square miles.

Records available October 1890 to September 1936.

| | |
|---|---|
| Average Discharge (46 years) | 1.44 c.s.m. |
| Maximum Discharge (March 19, 1936) | 30.71 c.s.m. |
| Minimum Discharge (November 29, 1930) | .066 c.s.m. |

(b) Penns Creek. Tributary to Susquehanna River.

1. Source:---In Gregg Township, southeastern Centre County.

2. Course:---Easterly, through Mifflin and Union counties into Snyder County forming Union-Snyder county boundary for 6 miles; thence southeasterly to Susquehanna River, 3 miles south of Selinsgrove, elevation 405.

3. Length:---Fifty-nine miles along stream.

4. Drainage Area:---Contains 558.0 square miles of mountainous country with narrow main valley flanked with steep hills. Geological formations are shale, sandstone and limestone containing some iron ore.

5. Discharge:---No records available.

(c) Sherman Creek. Tributary to Susquehanna River.

1. Source:---In Toboyne Township, southwestern Perry County.

2. Course:---Northeasterly to Susquehanna River at Duncannon, elevation 332.

3. Length:---Fifty-one miles along stream.

4. Drainage Area:---Contains 250.3 square miles of broken mountainous country, with a narrow main valley flanked with steep high hills between Pisgah and Rattlesnake ridges, and in lower course along northern slope of Pine Ridge. Shale, sandstone and limestone formations predominate.

5. Discharge:---Gaging station at Shermandale, Pennsylvania.

Drainage area above station, 200 square miles.

Records available September 1929 to September 1936.

Maximum Discharge (August 24, 1933) Discharge not determined.

Minimum Discharge (December 1, 1930) .019 c.s.m.

(d) Conodoguinet Creek. Tributary to Susquehanna River.

1. Source:---In Peters Township, western Franklin County, elevation 1,840.

2. Course:---Northeasterly into Cumberland County to Susquehanna River at West Fairview, elevation 299.

3. Length:---Ninety-nine miles along stream.

4. Drainage Area:---Contains 483.5 square miles of broad fertile Cumberland Valley between Blue Mountain on the north and South Mountain on the south. Well wooded in upper basin. Geological formations are principally shale and limestone containing iron ore deposits and many limestone springs.

5. Discharge:---Gaging station near Hogestown, Pennsylvania.

Drainage area above station, 470 square miles.

Records available September 1929 to September 1936.

Maximum Discharge (December 2, 1934) 27.87 c.s.m.

Minimum Discharge (December 16, 1930) .051 c.s.m.

(e) Yellow Breeches Creek. Tributary to Susquehanna River.

1. Source:---In South Mountain, Southampton Township, southwestern Cumberland County.

2. Course:---Northeasterly to Susquehanna River at New Cumberland, elevation 291.

3. Length:---Fifty-four miles along stream.

4. Drainage Area:---Contains 227.5 square miles of broad, fertile Cumberland Valley.

5. Discharge:--No records available.

(f) Swatara Creek. Tributary to Susquehanna River.

1. Source:---In Broad Mountain, Foster Township, western central Schuylkill County, elevation 1,660.

2. Course:---Southwesterly to Susquehanna River at Middletown, elevation 268.

3. Length:---Sixty-nine miles along stream.

4. Drainage Area:---567.4 square miles. The headwaters are in the Allegheny Mountains where the streams flow in narrow valleys between parallel ridges which are well wooded; main valley cuts through several ridges including Blue Mountain forming Swatara Gap and enters Piedmont Plateau region with broad valleys and highly cultivated rolling hills. Geological formations are shale and limestone in the mountains and contain rich deposits of anthracite coal. In the Piedmont Plateau the valley is eroded in shale, limestone and sandstone areas.

5. Discharge:---Gaging station at Harper Tavern, Pennsylvania.

Drainage area above station, 333 square miles.

Records available December 1918 to September 1936.

Average Discharge (17 years) 1.59 c.s.m.

Maximum Discharge (August 24, 1933) 75.98 c.s.m.

Minimum Discharge (September 24-25, 1932) .024 c.s.m.

(g) Conewago Creek. Tributary to Susquehanna River.

1. Source:---In South Mountain, Franklin Township, northwestern Adams County, elevation 1,560.

2. Course:---Easterly into York County; thence northeasterly to Susquehanna River at Yorkhaven, elevation 259.

3. Length:---Seventy-six and one-half miles along stream.

4. Drainage Area:---510.8 square miles. In Pennsylvania 505.6 square miles. The headwaters are located in South Mountain from which the main stream flows through the Narrows into a broad rolling agricultural country. The main valley becomes narrow, flanked with steep hills in the lower course.

5. Discharge:---Gaging station near Manchester Pennsylvania on the West Branch.

Drainage area above station, 510 square miles.

Records available October 1928 to September 1936.

Maximum Discharge (August 24, 1933) 93.3 c.s.m.

Minimum Discharge (August 7,8; October 20,1930) .039 c.s.m.

(h) Codorus Creek. Tributary to Susquehanna River.

1. Source:---Formed by junction of South Branch and West Branch in York County, 3 miles southwest of York, Pennsylvania.

2. Course:---Northeasterly through York to Susquehanna River, 1½ miles southeast of Saginaw, elevation 244.

3. Length:---Fifteen miles along stream.

4. Drainage Area:---268.0 square miles; in Pennsylvania, 267.8 square

miles of open rolling country in the Piedmont Plateau region. The broad main valley is flanked with rolling hills, narrowing to a gorge in lower 4 miles of course.

5. Discharge:---Gaging station on South Branch near York, Pennsylvania.

Drainage area above station, 117 square miles.

Records available May 1925 to September 1936.

| | |
|---|---|
| Maximum Discharge (August 23, 1933) | 174.35 c.s.m. |
| Minimum Discharge (August 28, 1935) | .007 c.s.m. |

(i) Conestoga Creek. Tributary to Susquehanna River.

1. Source:---In Caernarvon Township, southern Berks County, elevation 930.

2. Course:---Southeasterly to Morgantown; thence southwesterly to Susquehanna River at Safe Harbor, elevation 168.

3. Length:---Sixty-one miles along stream.

4. Drainage Area:---Contains 474.8 square miles of rolling agricultural land which is extensively cultivated. Below Lancaster the main valley becomes narrow. Extensive limestone formations throughout greater portion of basin; sandstone formation in headwaters.

5. Discharge:---Gaging station at Lancaster, Pennsylvania.

Drainage area above station, 322 square miles.

Records available September 1928 to September 1936.

| | |
|---|---|
| Maximum Discharge (August 24, 1933) | 70.81 c.s.m. |
| Minimum Discharge (October 14, 1931, September 15,23, 1932) | .028 c.s.m. |

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENTS

(a) Navigation.---In the early part of the nineteenth century a system of canals was constructed which served the Susquehanna Basin. This system consisted of a canal along the main stream from Sunbury to Chesapeake Bay; a canal along the North Branch from Wilkes-Barre to Northumberland, a canal along Bald Eagle Creek from Bellefonte to Lock Haven and from Lock Haven along the West Branch to Sunbury; and a canal paralleling the Juniata River from its headwaters to its mouth. Floods and the expansion of railroad facilities caused the abandonment of these canals about 1900.

The President's Committee on Water Flow* refers to studies which have been made for a system of waterways from Sunbury to Pittston, thence up the North Branch to Montezuma, N. Y., with a terminal on the New York Barge Canal, but no recommendations have been made. The same Committee has made studies of a proposed waterway system along the West Branch, from Clearfield to Sunbury, but made no recommendations.

The Corps of Engineers, U. S. Army, made a study of a proposed project for a navigable channel in the Susquehanna River from Harrisburg to Chesapeake Bay, with a combined power project. Their report, contained in House Document # 186, 69th Congress, 1st Session, concluded that the construction of a navigable channel should not be undertaken.

The entire Basin appears to be adequately served by existing railroads and there is apparently no need for a waterway transportation system for this area.

(b) Flood Control.

NORTH BRANCH.---The flood problem has been serious along the North Branch, and existing measures for flood control are inadequate. Major

* Development of Rivers and Harbors of the United States. House Document No. 395, 73rd Congress, 2nd Session. Page 82.

floods occurred 1902, 1935 and 1936. Lands in the Wyoming Valley are flooded when the river reaches a stage of 17 feet, a condition which has occurred 101 times between 1890 and 1929. These floods cause large monetary losses to property owners, industrial establishments, railways and highway systems. The flood of March 1936 caused the greatest amount of property damage. The National Emergency Council estimated the total damages caused by this flood in the North Branch Sub-Basin at $13,600,000.

1. Reservoirs and Detention Basins:--- 6 / There are no flood-control reservoirs in the sub-basin, although the large water supply reservoirs of the Scranton-Spring Brook Water Service Company afford a limited amount of flood protection.

2. Levees:---Federal funds were allotted to the War Department in August 1936 for the construction of levees in Wilkes-Barre and Hanover Township and for the construction of levees near Kingston and Edwardsville.

The former project is now under construction and consists of 8,000 lineal feet of levees along the east bank of the Susquehanna River. The amount allotted for this project was $1,860,000. $1,446,000 was allotted for the Kingston-Edwardsville project.

Channel Improvements:---The Water and Power Resources Board of Pennsylvania made studies of channel conditions of the Lackawanna River in the vicinity of Scranton. This Board, in a report submitted in April 1931, found that the channel encroachments restricted the natural flow of the river and increased flood heights. Recommendations were made for establishing channel lines, dredging the river bed, building retaining walls, raising the height of existing retaining walls, protecting stream banks and relocating many of the bridges to provide for a maximum flood discharge of 72 c.s.m. The recommended improvements were estimated to cost $3,680,000, but as yet none of these has been made.

6 / Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania; December 19, 1934. Page 214.

WEST BRANCH:---Floods have caused serious damage along the West Branch of the Susquehanna River at frequent intervals. Major floods, caused by excessive precipitation, occurred in 1865, 1889, 1894 and 1936. In 1918 a flood near Lock Haven, caused by an ice jam, resulted in property damages of approximately $1,000,000. The flood of 1889 inundated parts of Williamsport, Lock Haven and Milton, destroyed all bridges below Clearfield, and killed 78 persons. The flood of 1936 inundated all the low lying communities in the river valley. The National Emergency Council estimated the damages caused by the 1936 flood to private, municipal and corporate property at $21,300,000.

It is reasonable to assume that more devastating floods will occur in the future unless flood control works are constructed. The existing provisions for flood control are entirely inadequate. Construction of some local flood-control structures is under way at the present time.

1. Reservoirs and Detention Basins:---No flood-control reservoirs have ever been constructed in the sub-basin, and existing water-supply reservoirs are few and of limited capacity. The Corps of Engineers, U. S. Army, are now engaged in making a survey and study of the area in order to develop a plan for flood protection.

The Water and Power Resources Board, after making a study of conditions in 1927 submitted a report with recommendations for reducing the flood hazard in the Lock Haven sector. The proposed plan for control consisted of a dam 9 feet high and 860 feet long, to be constructed at an estimated cost of $165,000. This dam as proposed, would prevent the formation of ice gorges below Lock Haven. The construction of levees was also considered, but at that time levees were not thought to be feasible because of the limited borrowing capacity of the community. The proposed dam, below Lock Haven,was being constructed as a W.P.A. project in 1936, and was damaged

considerably by the flood in March of that year.

2. Levees:---There are no levees of importance along the West Branch of the Susquehanna River.

JUNIATA SUB-BASIN. There are no flood control works of importance in this sub-basin. Projects for flood protection have not been proposed in the past, although major floods occurred in 1889 and 1936 and lesser floods at frequent intervals. The 1936 flood caused damages estimated at $15,200,000 in this sub-basin.

Existing flood-control works are inadequate, but no proposals have been made for future flood protection works.

LOWER SUSQUEHANNA SUB-BASIN. Major floods have occurred in this sub-basin in 1865, 1889, 1894, 1902 and 1936 which affected all the low lying communities along the Susquehanna River. Floods on Codorus Creek, in the vicinity of York, caused $260,000 damages in 1894 and $4,360,000 in 1933. The floods of 1936 caused $10,000,000 worth of damage to property in the Lower Susquehanna Basin. Existing measures for flood-control are inadequate.

1. Reservoirs and Detention Basins:---In 1915 the City of Harrisburg constructed a flood control dam on Paxton Creek above the city, and paved the creek channel through the city, for the purpose of reducing flood damages. Although this dam protects the city from floods on Paxton Creek, high stages of the Susquehanna River cause considerable damage to property at Harrisburg.

Studies have been made for flood control dams on Codorus Creek for the protection of York, but so far no reservoirs have been constructed.

2. Channel Improvements:---The City of York has established channel lines along Codorus Creek within the city limits. The channel has been

made wider and deeper and the stream banks have been riprapped. While these improvements have increased the capacity of the channel, the construction of flood-control reservoirs will be necessary to provide adequate flood protection for the area.

(c) Municipal, Domestic and Industrial Supplies.

1. Domestic Supplies:---A tabulation of all cities, boroughs and unincorporated places (having a population of 500 or over) within townships in the sub-basin is included in Appendix A. This tabulation lists for each community the status of water supply and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

North Branch Sub-Basin:---Most of the communities in this sub-basin obtain adequate supplies of good quality from relatively clean upland sources. The Scranton and Wilkes-Barre metropolitan areas are served water of this type by the Scranton-Spring Brook Water Company. Three communities - Danville, Sayre and Berwick - obtain their supplies from the main stream of the North Branch Susquehanna River.

Computations made on the basis of data contained in the yearbook of the Pennsylvania-Department of Health for 1934 (unpublished) indicate that 80 communities in the sub-basin were served treated water, either filtered and chlorinated, or chlorinated. The total population served treated water amounted to 797,880 persons or 88 percent of the 1934 population. 132,100 persons residing in 7 communities, or approximately 14 percent of the estimated 1934 population, were served filtered water. 665,780 persons in 73 communities, or approximately 74 percent of the estimated 1934 population were served with chlorinated water. The remaining 12 percent derived their supplies from private springs or wells.

West Branch Sub-Basin:---In general, the communities of this sub-basin are supplied with an abundance of water of good quality from upland and underground sources. The main stem of the West Branch is not used as a source of supply except by Muncy and Lumber City which utilize it for auxiliary sources of supply.

Computations made on the basis of information contained in the year-book of the Pennsylvania Department of Health for 1934 (unpublished) indicated that 19,630 persons in 7 communities, or approximately 7 percent of the estimated 1934 community population, 7/ were served filtered water. In fifty-five communities chlorinated water was served to 168,850 persons or 61 percent of the estimated community population for 1934. Up-to-date data are not available for the remainder of the population, but it is assumed that the majority of these people, or 50 percent of the total estimated 1934 population of the sub-basin, derived their supplies from private wells and springs.

Juniata Sub-Basin:---The majority of communities in this sub-basin are supplied with water from upland sources. Approximately 46 percent of the estimated total 1934 population or 68 percent of the estimated 1934 community population 8/ were served purified water by public water supply companies.

Computations on the basis of the 1934 (unpublished) report of the Pennsylvania Department of Health indicate that 8,500 persons in 2 communities are served filtered water. This comprises approximately 4 percent of the estimated 1934 community population. Chlorinated water was

7/ See Table II-A. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-McNally & Company.

8/ See Table II-B. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places as reported by Rand-McNally & Company.

served to 131,200 persons in 20 communities, or approximately 64 percent of the estimated 1934 community population.

Lower Susquehanna Sub-Basin:---Water supply has not been a serious problem in this sub-basin, and most communities have adequate supplies of good quality. In some sections of the sub-basin, particularly in the eastern part of Cumberland County, the solution channels of the limestone formations cause a dangerous condition which affects many of the rural population depending on wells and springs for untreated supplies. In 1936 an outbreak of typhoid fever in the vicinity of Hogestown was responsible for eleven deaths.

Harrisburg, the largest city in the sub-basin, obtains its supply by filtering water from the Susquehanna River. At times of low flow, treatment is difficult and the water contains objectionable odors and tastes. Flood stages inundated the filter beds and pumping station of the municipal plant in 1936, making the city dependent upon emergency supplies obtained from surrounding cities and boroughs.

Other communities obtaining their supplies from the main stem of the river are Steelton, Columbia, Safe Harbor and Holtwood. Creeks, springs and wells are used by the remaining communities as sources of public water supply.

Data compiled from the yearbook of the Pennsylvania Department of Health 1934, (unpublished) indicate that 612,295 persons in 85 communities of the sub-basin were served purified water, either filtered, chlorinated or both. This comprised 63 percent of the estimated 1934 population of the sub-basin. It is assumed that the remaining 37 percent of the population derived their supplies largely from private springs and wells.

Filtered water was served to 366,675 persons in 38 communities; this

population represented 52 percent of the sub-basin community population.9/ Chlorinated water was served to 245,620 persons in 47 communities, which represented 35 percent of the sub-basin's community population.

2. Industrial Supplies:---There is no State Department having jurisdiction over industrial water supplies and complete data concerning them are not available. The Water Resources Inventory Report of the Water Supply Commission published in 1916 listed industrial supplies, but this information is now obsolete. In general the water using industries are located along the banks of the streams.

(d) Irrigation:---The Susquehanna Basin has an ample, dependable and well distributed rainfall which is generally sufficient for the needs of agriculture. Irrigation is unnecessary, and is not used except in small areas for the intensive cultivation of special crops.

(e) Water Power:---While the Susquehanna River has a large potential water power, little has been developed except in the Lower Susquehanna Sub-Basin.

1. Mechanical:---There are five mechanical water power plants, developing more than 100 horsepower in the Basin, all of which are located in the Lower Susquehanna Sub-Basin.

| Stream | Name of Plant | Total Installed Capacity in H.P. | Head in Feet |
|---|---|---|---|
| Mountain Creek | Mt. Holly Springs | 150 | 19. |
| Susquehanna River | York Haven | 3,400 | 19.5 |
| Swatara Creek | Hummelstown | 234 | 8. |
| Octoraro Creek | Pine Grove | 165 | 12. |
| Yellow Breeches Creek | New Cumberland | 335 | 8. |

9/ See Table II-C. This figure is made up of the population of incorporated places as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places as reported by Rand-McNally and Company.

2. Hydro-Electric:---Power needs are, for the most part, provided by steam plants. Because of the availability of cheap coal for power generation, hydro-electric power developments have not been attractive to private interests except in those cases where such projects do not require the erection of high dams or large storage reservoirs.

The following hydro-electric plants, of 100 horsepower or over, are located in the Susquehanna Basin: -

| Stream | Name of Plant or Location | Total Installed Capacity in H.P. | Head in Feet |
|---|---|---|---|
| North Branch - | | | |
| Fishing Creek | Benton | 150 | 16 |
| Fishing Creek | Bloomsburg | 570 | 29 |
| Susquehanna River | Susquehanna | 800 | 9 |
| Susquehanna River | Lanesboro | 300 | 6 |
| West Branch - | | | |
| Rock Run | Muncy Valley | 462 | 502 |
| West Branch | Williamsport | 100 | 9 |
| Spring Creek | Milesburg | 315 | 11 |
| Bald Eagle Creek | Howard | 100 | 6 |
| Juniata - | | | |
| Frankstown Branch | Warrier Ridge | 2,680 | 27 |
| Raystown Branch | Huntingdon | 3,900 | 36 |
| Kishacoquillas Creek | Yeagertown | 400 | 16 to 20 |
| Lower Susquehanna - | | | |
| Conodoguinet Creek | Roxbury | 800 | 57 |
| Conodoguinet Creek | Newville | 180 | 7 |
| Conodoguinet Creek | Carlisle | 400 | 8 |
| Conestoga Creek | Rock Hill | 525 | 8 |
| Conestoga Creek | Slackwater | 924 | 16 |
| Muddy Creek | Delta | 300 | 21 |
| Susquehanna River | York Haven | 29,213 | 22 |
| Susquehanna River | Safe Harbor | 255,200 | 53 |
| Susquehanna River | Holtwood | 158,000 | 48 to 63 |

The Safe Harbor plant was put into operation in 1931, and provisions have been made for an ultimate capacity of 510,000 H.P. Power from this plant is transmitted to Baltimore, Maryland.

The Holtwood plant was completed in 1910 and is operated in conjunction

with a steam plant of 30,000 H.P. The power from this plant is consumed in Baltimore, Md., York, Lancaster and Coatesville, Pa.

(f) Drainage:---Drainage has not been considered necessary in the Susquehanna River Basin in Pennsylvania, and there are no present or contemplated drainage projects of importance.

(g) Recreation and Wild Life:---There are excellent natural facilities, susceptible to development, for recreational purposes in the Susquehanna River Drainage Basin. The demand for recreational facilities has far exceeded the existing ones, and a study is now being made by the Division of Parks of the Department of Forests and Waters for a comprehensive system of State Parks and Parkways to adequately supply present and future recreational needs.

The Pennsylvania Fish Commission is conducting a program of stream improvement for the smaller unpolluted streams and is utilizing W.P.A.and C.C.C. labor for making these improvements. After the improvements have been made the streams are restocked with game fish.

North Branch Sub-Basin:---In 1934 this sub-basin contained 2,575 acres of recreational land, of which 875 acres were publicly owned and the balance privately owned. Recommendations have been made for the acquisition of 5,000 to 6,000 acres of land in Fairmont Township, Luzerne County, for the development of Ricketts' Glen recreational area. It is estimated that the cost of acquiring and developing this land will be $425,000.

In 1934 the State owned 193,000 acres of land in counties mainly within the sub-basin. Of this amount, 106,000 acres were State Forest Land, and 87,000 acres were owned by the Game Commission. Recommendations have

been made 10/ for the acquisition of 475,000 acres of State Forest Lands and 25,000 acres of State Game Lands.

West Branch Sub-Basin:---There were 6,000 acres of recreational land in the sub-basin in 1934. This amount is considered to be inadequate. In the same year, there were 1,138,000 acres of State owned land of which 1,002,000 acres were State Forest Lands and 136,000 acres were State Game Lands. Recommendations have been made 10/ for the acquisition of 640,000 additional acres of forest lands and 47,000 acres of game lands.

Juniata Sub-Basin:---In 1934 there were 1300 acres of recreational land in the sub-basin, of which 650 acres were publicly owned. The National Park Service has recently acquired land for recreational purposes in the northwestern portion of Bedford County and is now developing it as the Blue Knob Recreational Area.

The State owned, in 1934, 187,000 acres of land; of which 144,000 acres were State Forest Land and 43,000 acres State Game Lands. Recommendations have been made 10/ for the acquisition of 280,000 acres of State Forest Land and 48,000 acres of State Game Land.

Lower Susquehanna Sub-Basin:---In 1934 there were only 6,400 acres of recreational land in this sub-basin, of which 2,800 acres were publicly owned. This is considered to be inadequate for the present and future needs.

In the same year there were 134,000 acres of publicly owned forest land in this sub-basin, 15,000 acres of which were owned by the Game Commission and the remainder by the Department of Forests and Waters. Recommendations have been made 10/ for the acquisition of 154,000 acres of State Forest Land and 66,000 acres of State Game Land.

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10/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania. December 1934. Page 172.

(h) Correlated Uses:---The Wildwood Park Reservoir in Harrisburg is the only important reservoir for correlated water use in the Susquehanna Basin. Although its primary purpose is flood-control, the reservoir formed by the dam is used for recreational purposes including boating, fishing and ice-skating.

(i) Imported and Exported Water Supplies:---The water supplies for communities within the sub-basins of the Susquehanna River Basin are generally obtained from the sub-basin in which the community is located. No water is exported for use outside the Basin with the exception of at Sayre, Pa., which exports water to Waverly, N. Y., during the dry season, which usually covers a period of several months each year. No water supplies of any importance are imported into the Basin.

## V UNDERGROUND WATER

(a) Extent of Area and Supplies:---Groundwater is generally available throughout the Susquehanna River Basin for domestic and limited industrial use. In the areas surrounding active anthracite coal mining operations, the level of the groundwater has been lowered by continued pumpage, and most of the water which remains in reach of wells is unfit for domestic use.

The Topographic and Geologic Survey in Pennsylvania in cooperation with the United States Geological Survey has made studies of groundwater conditions and has issued reports covering the eastern and western portions of Pennsylvania. However, no reports have been published for the central portion of the State which embraces most of the Susquehanna River Basin in Pennsylvania.

It is known, however, that the wells in the northern portion of the Basin draw their supplies in general from sandstone formations, while most of those in the southern part derive their supplies from limestone formations.

(b) Character or Quality:---With few exceptions the chemical character of the groundwater is satisfactory for most purposes. The limestone waters are usually hard and contain bicarbonates of calcium and magnesium in varying degrees. The waters obtained from sandstones are usually soft, as are those obtained from quartzite formations. Waters from the larger springs in the limestone sections are not highly mineralized, as the flow through the solution channels is too large to permit the water to absorb large amounts of mineral matter.

(c) Economic Availability:---Groundwater is generally available for domestic and industrial use throughout the Basin. It is likewise available for limited public supplies and is utilized for this purpose by many of the smaller communities of the Basin. Springs are numerous throughout the entire Basin.

(d) Extent of Use:---While most of the larger communities of the Basin depend upon surface waters as sources of public supply, many of the smaller ones derive their public supplies from springs and wells. In 1934 there were 100 public water works in the Susquehanna Basin which served water from wells or springs to 146,658 persons. 75,860 of these were served treated water by 42 water works, while the remainder were served untreated water by 58 water works. Although no data are available concerning the 752,545 persons in this Basin which are not served by public water works, it is assumed that the majority of them depend upon wells and springs for domestic supplies. There is no information available concerning the use of groundwater for industrial supplies.

There are many large springs in the central and southern part of the Basin, with flows estimated from 2,000 to 20,000 gallons per minute. Boiling Springs, in southeastern Cumberland County, has an estimated flow of from 13,000 to 20,000 gallons per minute; Bellefonte Spring, in Centre County, has a flow of from 8,000 to 14,000 gallons per minute; Big Spring, in Cumberland County has an estimated flow of 10,000 gallons per minute; Rock Spring, in Centre County, has an estimated flow of 8,000 gallons per minute. The water supplying these and other large springs generally flows through solution channels in the limestone formations. In some places, these solution channels take the form of large underground storage basins which tend to regulate the flow of the springs.

(e) Prospective Uses:--- It appears that ground water will continue to be used as source of public supply for many of the smaller communities of the Susquehanna Basin, and that rural population which cannot be economically served by public water works will continue to derive their domestic supplies from private wells and springs.

In the urban areas, groundwater from drilled wells is being utilized for cooling and air conditioning purposes by theaters, hotels and public buildings. This use will probably increase in the future, and it is expected that large quantities of groundwater will be required to meet the demands of air-conditioning plants.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

Many of the streams of the Susquehanna River Basin are polluted by sewage and trade wastes. Raw sewage is discharged at various points into streams which are used as sources of public water supply. Waste water from coal mines and coal breakers creates troublesome conditions on many of the streams, making the treatment of water difficult and the existence of aquatic life impossible. Studies have been made of the pollution problems for various sections of the Susquehanna River by the Sanitary Water Board of Pennsylvania. The results of these studies indicate that a definite need exists for the abatement of pollution.

The North Branch above the confluence of the Lackawanna River is comparatively free from pollution. The Lackawanna River which drains the anthracite coal region is grossly polluted with acid mine drainage, culm and sewage. The water at the mouth of this river, where it discharges into the North Branch at Pittston, is usually black and contains a heavy load of culm and sewage. The condition of the water from this point does not improve as the river flows through the metropolitan Wilkes-Barre area, where an additional heavy sewage load is contributed. The tributary streams, draining the anthracite coal area, add materially to the culm load contributed by the Lackawanna River. The acid content of the stream retards the decomposition of sewage and causes the solids to settle to the bottom of the river channel. This sediment, together with the acid character of the stream, prevents the existance of any fish life. This condition continues downstream to Nescopeck.

From Nescopeck to Northumberland, the acidity of the water is neutralized by alkaline waters discharged by the tributaries. Decomposition

of the sewage, contributed by upstream communities, begins in this section and the river improves progressively down to its mouth at Northumberland.

The West Branch above the mouth of Bald Eagle Creek is decidedly acid due to mine drainage from the bituminous coal fields in the Clearfield region. The alkaline water of Bald Eagle Creek counteracts the acidity, so that from the confluence of Bald Eagle Creek to the point where the West Branch joins the North Branch the water is alkaline. Lock Haven and Williamsport contribute heavy sewage loads which produce only localized pollution conditions. Due to the width of the stream and the presence of many rapids, the condition of the stream improves rapidly. According to the results of a survey made in 1932 by the Sanitary Water Board of Pennsylvania, the oxygen balance of the stream from McElhatton to Northumberland was considered to be satisfactory.

The Juniata River at its headwaters is grossly polluted by sewage discharged by the city of Altoona, but there is an apparent recovery in oxygen balance from a point several miles below Altoona to Tyrone. At Tyrone the river is repolluted by sewage and industrial wastes, which causes a foul condition for a few miles below the city, from which point the stream condition gradually improves. From a few miles below Tyrone to its confluence with the Susquehanna River at Newport, the river is in good condition from a sanitary viewpoint. Sewage loads are contributed by Huntingdon, Mt. Union and Lewistown, but these loads produce only local pollution and do not adversely affect the conditions of the river further downstream.

The main branch of the Susquehanna River from Sunbury to its mouth is wide and contains many rapids and riffles. The presence of these physical characteristics, add to the self-purifying properties of the stream. A heavy sewage load is imposed on the stream at Sunbury, but from this point

downstream to Harrisburg little sewage is discharged into the river. The tributaries entering the river from the east contain large quantities of acid mine drainage and culm, while those entering from the west are generally alkaline. These two types of water entering from the tributaries do not comingle at times of low flow, and at such times the river appears to contain many "color ribbons." Harrisburg and Steelton contribute heavy sewage loads, but the stream recovers a short distance below Steelton. Further downstream the river is repolluted by the water from Codorus Creek which carries the pollution load of the York area. Below York Haven, the power dams create large storage reservoirs which decrease the velocity of flow and act as sedimentation basins, thus aiding the rapid recovery in the condition of the stream.

The most serious problems occur during times of low flow when the decrease of velocity permits culm, carried downstream from the anthracite region, to settle. This culm collects in pools and pockets in the river beds, and during freshets these deposits are purged, imposing a heavy load of sulphuric acid on the stream, killing fish and producing a heavy load on water filteration plants.

(a) Sewage.

North Branch Sub-Basin:---According to a report submitted to the Pennsylvania State Planning Board by the State Department of Health in March 1935, there were in this sub-basin 5 communities having sewage treatment works. The estimated 1934 population 11/ of these communities was 10,711 persons or about 1.4 percent of the community population 12/ of this area.

11/ Estimated by Pennsylvania State Planning Board.

12/ See Table II. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places as reported by Rand-McNally and Company.

There were 46 communities in the sub-basin having public sewers but without sewage treatment works. The total estimated 1934 population of these communities was 516,212 persons or 68.6 percent of the community population 11/ of the sub-basin. The total population of these 46 communities was not necessarily served by the public sewers, and no data are available concerning the number of persons in these communities served by such facilities.

The Sanitary Water Board of the Department of Health has issued orders to the boroughs of Canton and Sayre to install sewage treatment plants. Such orders are issued only in connection with permits granted to communities for extending or reconstructing sanitary sewers.

The borough of Clarks Summit has filed an application with the P.W.A. for the construction of a complete sanitary sewer system and sewage treatment plant. The estimated cost of this project is $391,000.

The city of Scranton has a P.W.A. project under construction for additional sanitary sewers and a sewage pumping station. The estimated cost of this project is $80,124.

West Branch Sub-Basin:---According to the above mentioned report, there were 4 communities in this sub-basin having sewage treatment plants in 1935. These communities had an estimated 1934 population 7/ of 10,488 persons or about 3.8 percent of the community population of this area.

Data compiled from the same source indicated that 34 communities had public sewers but no sewage treatment works. These sewers emptied into streams or into sewers of adjoining communities, some of which may have sewage treatment plants. The combined estimated 1934 population of these

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7/ See Table II-A. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population if unincorporated places in 1934 as reported by Rand-McNally and Company.

34 communities was 140,992 or approximately 51 percent of the community population of the sub-basin. No data are available concerning the percent of the population of these communities actually served by public sewers.

There is a P.W.A. project pending for the construction of a complete sewage disposal plant for the borough of State College. The estimated cost of this project is $121,000. At present, the sewage of the borough is treated at the plant of Pennsylvania State College.

Juniata Sub-Basin:---The report of the Pennsylvania Department of Health listed only one community, Altoona, having a sewage treatment plant in this sub-basin. The estimated 1934 population of this city was 79,843 persons or about 38.8 percent of the community population 7/ of the sub-basin.

Data compiled from the above source indicated that 17 communities in the sub-basin had public sewers but no sewage treatment plants. The combined estimated 1934 population of these communities 8/ was 71,013 persons or approximately 34.5 percent of the community population of the sub-basin. No data are available concerning the number of persons in these 17 communities actually served by the public sewers.

The Sanitary Water Board of the Pennsylvania Department of Health has issued orders, in conjunction with permits granted, to the boroughs of Bedford, Tyrone, Huntingdon and Mount Union to provide adequate sewage treatment facilities. These do not necessarily constitute all the communities in the sub-basin that need sewage treatment works, since such orders are granted only in connection with permits granted on application of a municipality to extend or reconstruct its sewers. Of these four

8/ See Table II-B. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places as reported by Rand-McNally and Company.

boroughs only one, Bedford, has prepared plans for a sewage treatment plant and sanitary sewer system. The estimated cost of the treatment plant is $35,000, and of the sewer system, $135,000.

Lower Susquehanna Sub-Basin:---The above mentioned report of the Pennsylvania Department of Health listed 10 communities in the sub-basin having sewage treatment plants. The combined estimated 1934 population of these 10 communities was 184,329 persons, or approximately 26.4 percent of the community sub-basin population. 9/

Data compiled from the same source indicate that 25 communities, with a combined estimated 1934 population of 253,919 persons or about 36.3 percent of the community sub-basin population, had public sewers but no sewage treatment plants. No data are available concerning the number of persons in these communities actually served by public sewers.

The township of Spring Garden, in York County, has a P.W.A. project pending for the construction of sanitary sewers. Sewage from this township will be treated at the central disposal plant at York, Pa. The estimated cost of the proposed sewers in this township is $794,545.

A sewer system is now under construction for the borough of Penbrook, which will, when completed, connect with the sewer system of Harrisburg, Pa. The estimated cost of this construction is $130,909.

(b) Trade Wastes:---The Sanitary Water Board of Pennsylvania has endeavored over a period of years to obtain the proper disposal of industrial wastes which are discharged into the waters of the State.

An agreement was made with the tanning industry in 1924, and a committee was organized to study the treatment of tannery wastes. Funds for

9/ See Table II-C. This figure is made up of the population of incorporated places as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places as reported by Rand-McNally and Company.

this study were provided by the tanning industry. Experimental plants were constructed, and a report was issued which contained the results of the studies together with recommendations for the control of tannery wastes. The recommendations were accepted by the Sanitary Water Board, and the majority of tanning plants have followed the recommendations of the Committee, installing necessary treatment facilities which have brought about a reduction in the amount of pollution from this source.

A similar agreement made with the pulp and paper industries in 1926, has resulted in the reduction of pollution from industries of this type. The Sanitary Water Board has undertaken a study for the proper treatment of sulphite wastes which are now being discharged by many of the pulp and paper manufactures. In 1928 agreements were made with the by-product coke industry and the manufactured gas industry. These agreements resulted in the adaption of treatment methods which reduced pollution from these sources.

(c) Oilfield and Mining Wastes:---The production of anthracite coal is the major industry of the North Branch Sub-Basin and extends southward into the Lower Susquehanna Sub-Basin. Culm and mine refuse are piled on low areas adjacent to streams. During times of high water stages, culm and refuse from these dumps is washed into the stream channels. Culm and silt from coal washeries is carried directly into the streams from those breakers which do not have adequate settling beds for the wash water. Mine drainage also contributes to the pollution of the streams.

These mine wastes contain a large amount of sulphuric acid which kills aquatic life and makes water treatment difficult. The silt and culm is washed down stream and restricts stream channels, which increases the flood hazard.

Although some operators have installed sludge ponds for settling the

waste products, little improvement has been made in the condition of the streams. Finer sizes of coal are being recovered from the breakers, and in some instances the silt is being used for filling abandoned workings.

According to information contained in a report made by the Pennsylvania Topographic and Geologic Survey in 1928 there are approximately 900,000,000 tons of fine coal in the stream beds. Approximately 10,000,000 tons of coal have been recovered by dredging processes. Since the progress of the culm and silt towards Chesapeake Bay is very slow, it is evident that many years would be required for the river system to clear itself of the mine refuse already in the stream beds. Additional refuse is constantly being deposited in the stream channels increasing the burden of the streams. Many problems are presented in the treatment of mine wastes, the solutions to which can be obtained only through cooperation and studies by the mine operators.

Pollution from bituminous coal mines is serious in the West Branch Sub-Basin. Large amounts of sulphuric acid are discharged into the streams causing the waters to be acid as far downstream as Lock Haven. The sulphuric acid comes from waste water and mine drainage discharged by both active and abandoned mines, and from industrial wastes and gob piles which have been deposited in or along the streams. The refuse from the mines is washed downstream where it accumulates in pockets in the stream channels. At times of freshets or highwater these pockets are purged, imposing a high acid load which kills all fish life. Although an agreement made in 1929 with the operators of bituminous coal mines has resulted in a slight reduction in pollution, the results have not been great enough to remedy the condition.

"Under various "Emergency Programs" and currently under W.P.A., re-

duction of the acid drainage has been attempted by sealing abandoned mines. These projects sponsored by the Pennsylvania Department of Health provide for the **air**-sealing of abandoned mines to prevent the formation of acid caused by the oxydation of pyrites. A survey is now being conducted by the Department of Health to obtain factual information pertaining to the number of abandoned mines, the amount of acid drainage and the effects of the work accomplished.

There is a small oilfield located in the western part of Tioga County, but pollution from this source is negligible.

(d) Silt and Erosion:---The Soil Conservation Service of the U. S. Department of Agriculture has made a Reconnaissance Erosion Survey of Pennsylvania. Locations of prevailing types of erosion are portrayed on a map issued by the above mentioned Bureau in 1935.

North Branch Sub-Basin:---Large areas in the northern part of the sub-basin are subject to moderate sheet erosion. These areas are, in general, located along the banks of the North Branch, and in the northeastern section. The lower section of the sub-basin is subject to moderate sheet erosion with occassional gullies. Most of the tributaries have rapid flows and tend to clear their channels of accumulations washed down from the upper reaches. Check dams would aid in preventing the material from from being washed downstream but the problem should be solved at its source. Erosion control will necessitate the planting of steep slopes, subject to erosion, in soil conserving crops or grasses.

West Branch Sub-Basin:---There is little or no erosion in the northern part of the sub-basin due to the fact that most of the area is forested. There are large areas in the southern part subject to moderate sheet erosion with occassional gullies. These areas are, for the most part, located

along Bald Eagle Creek and the main stem of the West Branch from Lock Haven to Northumberland. It would appear that considerable quantities of silt are washed into these streams but no definite information on this subject is available.

Juniata Sub-Basin:---The high lands and ridges occupying this sub-basin are well wooded and are not subject to erosion. The narrow valleys between the ridges are subject to varying degrees of erosion. Large areas of these low lands are subject to moderate sheet erosion with occassional gullies. In the western portion of the sub-basin, particularly in the vicinity of Petersburg, Huntingdon County, there are small areas subject to severe sheet erosion. It would appear that the streams of the sub-basin carry large amounts of silt, but no factual data pertaining to the amount of silt carried by them are available.

Lower Susquehanna Sub-Basin:---Large areas in this sub-basin are subject to moderate sheet erosion. Such areas exist above Harrisburg and in York and Lancaster Counties. In these two counties the rapid run-off which follows every heavy rain carries much soil from the extensively cultivated farm lands.

(e) Irrigation and Drainage:---Irrigation is used to a very limited extent in the Basin and there are no drainage systems of importance. Pollution from these sources is therefore negligible.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:---Although navigation was extensively developed in the Susquehanna River Basin in the nineteenth century, by a system of canals paralleling the main stream and its major tributaries, these canals were abandoned prior to 1900. At the present time navigation is limited to the tidewater section of the Susquehanna River, from Chesapeake Bay to Port Deposit, Maryland. As previously mentioned, several reports have been prepared on the advisability of constructing a modern system of waterways for various reaches of the river. None of these reports has recommended the construction of any navigation project. Existing railroad and highway transportation systems are apparently adequate for the present and immediate future needs of the Basin. However, suitable safeguards for possible future navigation facilities should be considered in connection with any water power developments.

(b) Flood Control:---Flood Control is the major need of the Susquehanna River Drainage Basin. Great floods have occurred on the Susquehanna River and its main tributaries, and all communities located on the flood plains of these streams have suffered enormous flood damages. Although these major floods have not occurred frequently, floods of lesser magnitude occur regularly and result in property damages and interruptions to business and communication systems.

Williamsport, Wilkes-Barre, Lock Haven, Sunbury, Lewistown and York are subject to serious flood damages, while many of the other communities are subject to lesser damages.

No adequate flood protection works have been constructed by any community in the Basin. Flood control has, in the past, been regarded as a

local problem for the communities subject to flood damages. However, this attitude has recently changed, and at the present time surveys and studies are under way to provide factual data for a flood prevention plan for the entire Basin.

The construction of levees has been deemed advisable for the immediate protection of certain communities, and funds for this construction have been alloted for Wilkes-Barre, Kingston and Edwardsville. Levees have been recommended for other communities, but construction has been deferred due to financial reasons and the refusal of the communities to cooperate with State and Federal agencies.

The Corps of Engineers, U. S. Army, is now engaged in **making** a study of possible locations for flood control reservoirs near the headwaters of the streams; and the Pennsylvania Department of Forests and Waters is co-operating in making additional studies for Pennsylvania. It has been contended that sites are not available for the construction of reservoirs large enough to control the flood waters of these streams, and that levees are the only possible solution to the problem. Public opinion is naturally adverse to this type of protection which acts as a constant reminder of the flood hazard. Levees will afford only partial protection to the people and property located in the flood plains. Ultimate protection can be secured only through a combined plan of flood control reservoirs, channel improvements, levees and intelligent zoning. Much of the property subject to flood damages should be removed to higher ground.

(c) <u>Municipal, Domestic and Industrial Supplies</u>:---In general, water supply does not present a serious problem in this Basin. However, there are many of the smaller communities without public water supplies for which such facilities should be provided. The larger communities are supplied with

water which is adequate in quantity and of good quality. Most of the larger supplies are obtained from upland sources and from creeks.

Harrisburg is the largest city which utilizes the main stream of the river as a source of supply. During times of low flow, the hardness of the water is increased, and difficulty is experienced in filtering and treating it. The filter plant for the Harrisburg supply, located on an island, is subject to damage from floods. During the flood of March, 1936, the flood waters completely inundated the filter plant, and caused a serious curtailment of supply even after the flood stage had subsided. Due to the danger of curtailment of supply during flood stages and due to the hardness and degree of pollution of the water at low stages, it would seem advisable that studies be made for obtaining a dependable supply of wholesome water from clean upland sources.

Other communities are in need of minor improvements and extensions to their existing supplies and these should receive proper consideration.

Many of the smaller communities of the Susquehanna Basin utilize groundwater as a source of supply. In 1934 there were 100 water works in the Basin serving water from underground sources to 146,658 persons. In the same year 752,545 persons, not served by public water works, utilized underground waters as sources of public supply. Since approximately 35 per cent of the Basin's population is dependent upon groundwater as a source of supply, it would seem advisable that additional groundwater studies be made to determine the extent and probable future availability of groundwater for this purpose. Although groundwater is now being utilized in many localities for cooling and air-conditioning purposes, it is to be expected that this use will increase in the future.

No adequate data are available concerning industrial water supplies, or the adequacy of such supplies, in the Susquehanna River Basin.

(d) Irrigation:---Irrigation is not necessary in the Susquehanna River Basin. In the past, rainfall has been adequate to supply the needs of vegetation and irrigation has not been practiced except in the intensive cultivation of special crops.

(e) Water Power:---As indicated in Section IV - (e) water power has been extensively developed on the lower section of the Susquehanna River. The existing plants are interconnected with large steam operated plants in the vicinity of Philadelphia, Pa. and Baltimore, Md. and are used for base or peak loads depending upon the river stages.

According to a report made by the Corps of Engineers, U. S. Army - H. D. #395, 73rd Congress, 2nd Session - there were 46 potential power and storage sites on the Susquehanna River. Twenty of these sites were considered to be suitable for storage only, and the remaining 26 were considered suitable for power dams. The report recommended the construction of a system of ten hydro-electric plants, nine of which are located in Pennsylvania, when the need for additional power becomes evident.

These projects listed in the recommended order for construction are:

| SITE | INSTALLED KILOWATTS | FIRST COST NOT INCLUDING INTEREST DURING CONSTRUCTION | ANNUAL CHARGE |
|---|---|---|---|
| Raystown | 141,000 | $ 21,528,000 | $ 2,368,000 |
| Add. Units at Safe Harbor | 90,000 | 5,400,000 | 594,000 |
| Shocks Mills | 386,000 | 42,832,000 | 4,711,500 |
| SUSQUEHANNA #6 | | | |
| Marysville | 165,000 | 22,582,000 | 2,484,000 |
| Keating | 514,000 | 68,647,000 | 7,551,200 |
| SUSQUEHANNA #7 | | | |
| Clarks Ferry | 161,000 | 23,325,000 | 2,565,800 |
| SUSQUEHANNA #8 | | | |
| Paxton | 224,000 | 29,025,000 | 3,192,800 |

| SITE | INSTALLED KILOWATTS | FIRST COST NOT INCLUDING INTEREST DURING CONSTRUCTION | ANNUAL CHARGE |
|---|---|---|---|
| WEST BRANCH #1 Muncy | 56,700 | $ 9,190,000 | $ 1,010,900 |
| WEST BRANCH #2 Farrandsville | 134,400 | 16,871,000 | 1,855,800 |
| TOTAL | 1,872,100 | $239,400,000 | |

(f) Drainage:---In the past, drainage has not been necessary in the Susquehanna River Basin except in small localized areas. Apparently there is no need for any large scale drainage projects in this Basin.

(g) Recreation and Wild Life:---There is a definite need for additional recreational facilities in this Basin. The popularity of all forms of recreation such as boating, swimming and fishing is increasing and present facilities are inadequate. Provision for such facilities should be included in water development for other purposes whenever possible and in certain instances developments primarily for recreational uses is desirable.

The Preliminary Report of the Pennsylvania State Planning Board, December 1934, states, "The recreational use of the forest is an equal public service, and shortly may be recognized as even a greater one than supplying raw wood materials where population is as dense as Pennsylvania's ---A specialized phase of the use of land for recreation must be recognized in hunting and fishing."

Recommendations have been made by the Pennsylvania State Planning Board for the acquisition of approximately 186,000 acres of land for game refuges and hunting grounds, and for 1,549,000 acres of additional State Forest Lands.

In connection with the construction of large reservoirs, 13/ it is considered desirable by authorities on wild life to build low water dams in the draws of the main reservoirs in order to maintain pools for the propogation of fish, water fowl and fur-bearing animals when the main reservoir is drawn down - Mr. O. M. Deibler, Commissioner, Pennsylvania Fish Commission, recommends a minimum water area of 5 acres for such pools.

(h) Rectification of Existing and Prevention of Future Contamination:--- The discharge of untreated wastes from municipalities, industries and coal mines presents a serious pollution problem in the Susquehanna River Basin.

A report on Water Pollution by the Special Advisory Committee of the National Resources Committee in 1935 states - "That the problems of stream pollution by industrial waste and domestic sewage are outstripping the best efforts of those whose function it is to effect an economical and rational balance between sensible regulation and industrial expansion.-- That control of stream pollution is generally and logically a function of State government, and that in most states existing legal authority to limit the degree of water pollution must be exercised with rare judgment to prevent curtailment of industry which might produce undesirable social and economic consequences."

Statistics indicate that most of the municipalities in the Basin discharge their sewage untreated into the streams. There is a definite need for the abatement of pollution arising from this source. In the interest of health, all the larger cities should treat their sewage before discharging it into nearby streams. However, communities along the Lackawanna River, which contains large amounts of sulphuric acid, should not be obliged to treat their sewage until the acid condition of this stream is remedied. The acid waters prevent the decomposition of the sewage, so that nuisance

13/ Suggested by Mr. Seth Gordon, Executive Secretary, Pennsylvania Game Commission.

conditions from sewage do not occur.

Pollution of streams by anthracite mine wastes originate chiefly along the North Branch and its tributaries below Pittston. Pollution of this nature can be prevented only at its source. There is a definite need for research and studies to discover a suitable method for the prevention of pollution from anthracite mines.

Along the West Branch above Lock Haven, acid mine water from bituminous mines is the chief cause of pollution. The continuation of the present mine sealing program for abandoned mines will aid in the abatement of this condition. No effective method has been developed for the elimination of acid mine water from active mines. This matter should receive further study.

Although agreements have been entered into with different industries for the treatment of their wastes, they have not been adhered to strictly. In regard to trade wastes, Dr. W. L. Stevenson, Chief Engineer, Pennsylvania Department of Health, in a paper presented to the Chemical Engineering Congress of the World Power Conference, stated:- "The increase in different kinds of industrial wastes and in the aggregate volume discharged into streams together with the increasing need to use streams for public purposes has made control of resulting harmful pollution an urgent public problem, the solution of which so far has generally been by abatement through corrective means of treatment."

"This corrective way should be expanded by or under the auspices of central governments, by research toward lessening the pollution potentialities of industrial wastes through changed processes of manufacture, re-use of usable wastes and recovery of marketable by-products as preventative measures thereby minimizing corrective works."

"This is too big a task for single units of government or of industry to successfully undertake. It requires an impartial, competent, centralized authority, working in close cooperation with State authorities and with industries."

# POTOMAC RIVER BASIN

## I GENERAL DESCRIPTION OF THE POTOMAC BASIN 14/

(a) Length:---In Pennsylvania, maximum 35 miles.

(b) Breadth:---In Pennsylvania, maximum 98 miles.

(c) Area:---In Pennsylvania, 1,570 square miles.

(d) Physiography:---Entire Basin 15/ lies within the Appalachian Highlands.

1. Topography:---The western half of the Basin lies in the Allegheny Mountains, the Allegheny escarpment being the western watershed. This mountain system traverses the Basin in a series of parallel ridges running northeasterly to southwesterly. The eastern half of the Basin lies in the Piedmont Plateau. The Blue Ridge Mountains terminate in South Mountain, which traverses the Basin in western Adams County. Between South Mountain and the Allegheny Ranges lies the broad, fertile Cumberland Valley. The streams flow southerly and many of them in the western part of the Basin lie in valleys between the ridges.

2. Geology:---The extreme folding of the strata and subsequent erosion have exposed the rocks in a series of parallel outcrops. Sandstones and shales prevail in the higher areas, while the limestones are generally found in the valleys. The Cumberland Valley is principally a limestone formation, abounding in springs, while South Mountain, and the Plateau region to the east, are of sandstone, shale and trap formations.

(e) Cover:---See Reconnaissance Land Use Map (Fig. III) and Table IX which indicates the proportion of various types of cover within the Basin.

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14/ Source:Paragraphs (a) and (b):-Scaled from Stream Map of Pennsylvania-Scale-6 miles = 1 inch. Paragraphs (c) and (d):-Water Resources Inventory Report, Part III - Gazatteer of Streams. -Pennsylvania Water Supply Commission, Harrisburg, Pennsylvania, 1916. (f) Preliminary Report of Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934, Page 69.

15/ All further references to the Potomac Basin in this report, except as noted, refer to that portion of the basin lying within Pennsylvania.

TABLE IX

APPROXIMATE FORESTED AND CLEARED LAND CLASSIFICATIONS

POTOMAC DRAINAGE BASIN IN PENNSYLVANIA

| Classification | Acres | Percentage of Area |
|---|---|---|
| Forested | 393,000 | 39% |
| Cleared Non-Farm | 36,000 | 4% |
| Cleared Farm | 517,000 | 51% |
| Cleared Urban, R. R., Highways, etc. | 59,000 | 6% |
| Total Land | 1,005,000 | -- |

Note:- Prepared from "County area data" in the files of the Department of Forests and Waters, assuming parts of counties in watershed have same proportions of each land class as the entire county.

(f) Climate:---In the extreme eastern portion of the Basin, embracing Adams County, and in the extreme northern portion, embracing the northwestern part of Franklin County, the mean annual precipitation varies from 39 to 44 inches; in the remainder of the basin, it varies from 34 to 39 inches. The average annual snowfall varies from 35 to 40 inches.

Temperatures of 100° or higher are recorded practically every summer, while temperatures of 20° to 25° below zero are occasionally recorded during winter months in mountainous sections. The summer mean temperature varies from 58° in the western portion to 60° in the eastern portion. The mean annual temperature varies from 50° in the western portion to 54° in the eastern portion.

The prevailing winds are from the west and southwest.

(g) General Relation to Adjoining Basins:---The Potomac Basin is bounded on the west by the Youghiogheny and Monongahela Basin; on the north by the Juniata Basin and on the northeast and east by the Lower Susquehanna Basin.

## II HUMAN OCCUPANCY

In 1930, the Potomac Basin had a population of 93,311 persons. 16/. This comprised nearly 1 per cent of the population of Pennsylvania and 0.1 per cent of the population of the United States.

The average density of population was 59 per square mile in 1930.

Fig. IV shows the distribution of population in 1930 for Pennsylvania by drainage basins.

(a) Cities and Towns:---Information regarding the number, classification by population, size and rate of development, and general character of cities and towns of the Basin is given in Tables X and XI.

(b) Rural Development:---

1. Agricultural:--- 17/ The eastern portion of the Basin lies in the Cumberland fruit, poultry and dairy region; the central portion lies in the Central Appalachian Ridges Diversified Farming belt; and the western portion lies in the Allegheny Mountain Part-time Self-sufficing Farming district.

Table XII gives statistics pertaining to counties mainly within the Basin and shows trends in Agricultural Development. The farm population for the area involved was 24,334 in 1930. This increased to 27,345 in 1935.

2. Industrial (decentralized):---The major decentralized industries of the Potomac Basin include the production of leather and rubber goods, lumber and its remanufacture, food and kindred products, textiles, textile products and quarry products.

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16/ Based on U. S. Census 1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each basin is estimated as proportional to area. Towns on the line are place in one basin or the other.

17/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934. Page 106.

TABLE X

POPULATION CLASSIFICATION OF POTOMAC BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934 ** Population | ESTIMATED 1934 ** Per Cent of Total Basin | ESTIMATED 1934 ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CITIES AND BOROS | | | | | | | | | | | | | |
| 10,000 -- 25,000 | 2 | 14,260 | 17.2 | 23,955 | 25.7 | 42.2 | 23,536 | 24.8 | 40.9 | 9,695 | 68.0 | -419 | -1.8 |
| 5,000 -- 10,000 | 1 | 3,500 | 4.2 | 5,584 | 6.0 | 9.8 | 5,776 | 6.1 | 10.1 | 2,084 | 59.5 | 192 | 5.4 |
| 2,500 -- 5,000 | 1 | 1,460 | 1.8 | 2,557 | 2.7 | 4.5 | 2,382 | 2.5 | 4.1 | 1,097 | 75.1 | -175 | -7.3 |
| Under -- 2,500 | 8 | 5,010 | 6.1 | 8,026 | 8.6 | 14.1 | 9,063 | 9.5 | 15.8 | 3,016 | 60.2 | 1,037 | 12.9 |
| TOTAL CITIES AND BOROS | 12 | 24,230 | 29.3 | 40,122 | 43.0 | 70.6 | 40,757 | 42.9 | 70.9 | 15,892 | 65.6 | 635 | 1.6 |
| TOWNSHIPS | | 58,398 | 70.7 | 53,189 | 57.0 | -- | 54,146 | 57.1 | -- | -5,209 | -9.8 | 957 | 1.8 |
| Unincorporated Villages | | | | *16,724 | 17.9 | 29.4 | 16,724 | 17.6 | 29.1 | -- | -- | | |
| Scattered | | | | 36,465 | 39.1 | -- | 37,422 | 39.5 | -- | -- | -- | 957 | 2.6 |
| TOTAL Population Residing in Communities | | -- | -- | 56,846 | 60.9 | 100.0 | 57,481 | 60.5 | 100.0 | -- | -- | 635 | 1.1 |
| GRAND TOTAL POTOMAC BASIN | | 82,628 | 100.0 | 93,311 | 100.0 | -- | 94,903 | 100.0 | -- | 10,683 | 12.9 | 1,592 | 1.7 |

* 1934 Estimate by Rand McNally & Company. (1900 Per Cent of Penna. Population in Potomac Basin 1.3 - of U.S. .1)
** Estimate by Penna. State Planning Board. (1930 Per Cent of Penna. Population in Potomac Basin 1.0 - of U.S. .1)

TABLE XI

CLASSIFICATION OF CITIES AND BOROUGHS IN POTOMAC BASIN

| Cities & Boroughs | | County | Population-1930 U. S. Census | Percent Change 1900 to 1930 | Predominate* Type of Industry |
|---|---|---|---|---|---|
| 10,000 to 25,000 | | | | | |
| Chambersburg | | Franklin | 13,788 | 55.6 | T & M & A |
| Waynesboro | | Franklin | 10,167 | 88.4 | M |
| Total | (2) | | 23,955 | 68.0 | |
| 5,000 to 10,000 | | | | | |
| Gettysburg | | Adams | 5,584 | 59.5 | M & A |
| Total | (1) | | 5,584 | 59.5 | |
| 2,500 to 5,000 | | | | | |
| Greencastle | | Franklin | 2,557 | 75.1 | M |
| Total | (1) | | 2,557 | 75.1 | |
| Total Under 2,500 | (8) | | 8,026 | 60.2 | |
| Total All Cities & Boroughs | (12) | | 40,122 | 65.6 | |

*A - Agriculture
(M) - Mining
T - Transportation
M - Manufacturing

TABLE XII

NUMBER OF FARMS AND THE AMOUNT

OF LAND IN FARMS FOR COUNTIES LOCATED MAINLY IN THE POTOMAC

BASIN

| Year | No. of Farms | Land in Farms (acres) | Percent of Total Area | Percent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 5,426 | 594,387 | 80.5 | 3.1 |
| 1910 | 5,674 | 582,192 | 78.9 | 3.1 |
| 1920 | 5,234 | 589,675 | 79.9 | 3.3 |
| 1925 | 5,161 | 510,785 | 69.2 | 3.1 |
| 1930 | 4,731 | 506,145 | 68.6 | 3.3 |
| 1935 | 5,216 | 515,972 | 69.9 | 3.3 |

Source:- Census of Agriculture - U. S. Department of Commerce.

3. Mining (Including petroleum):---With the exception of several very small mines in Bedford County, coal is not mined in the Potomac Basin in Pennsylvania.

4. Lumbering:---The lumbering industry which reached its peak in Pennsylvania in 1900 has been declining since that time and at present is relatively unimportant in the State although it remains a potential industry for the future. As indicated by the Land Use Map (Fig. III) there is considerable forest land in the northern part of the Basin which under "sustained yield" development might play a part in the rejuvenation of lumbering.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies under Sections (a) and (b).

1. Cities and Towns:---Study of Table X indicates the rapid growth of boroughs in the Basin which nearly doubled in population between 1900 and 1930 and which as a group have shown a slight gain between 1930 and 1934. The township population has decreased slightly. There has been some tendency for the population to draw together in communities but nearly 40% of the population still lives in the townships.

2. Agriculture:---Trends in agricultural development shown in Table XII indicate a reduction in the number of farms and area of farm land. This is in line with improved agricultural production methods and consequent decrease in needed acreage and manpower despite increasing production. The reversal in trend during the past five years is thought to be temporary and is probably accounted for by the fact that some land formerly abandoned as incapable of producing an adequate return is now occupied by persons forced to leave the cities and towns by depressed industrial conditions.

As may be seen on the Reconnaissance Land Utilization Map (Fig. III) the western half of the Basin is "below average" and "sub-marginal" farm land and forest land. In the eastern half of the Basin, there is very little farm land classed as "below average" or "sub-marginal." In Franklin County, there are large areas of "superior" and "above average" farm land.

3. Industry:---No detailed study of industrial trends in the State has been made and consequently no definite statements concerning the matter can be made.

(d) Transportation Facilities:---

1. Waterways:---None in Basin.

2. Highways:---The Basin is traversed by well paved highways connecting principal centers of population. There is on file with the State Planning Board a map issued by the State Highway Department showing the highway system in detail.

3. Railways:---The western portion of the Basin is traversed from north to south by the Pennsylvania R. R. and the Baltimore and Ohio R. R. The central portion of the Basin is without railway facilities. In the eastern portion of the Basin, the Pennsylvania, Philadelphia and Reading, and Western Maryland railroads traverse the Basin.

4. Airports:---The United States Department of Commerce, Airway Bulletin Number 2, September 1, 1934, lists 2 airports in the Potomac Basin. The Basin is traversed by one major airlane.

III STREAMS OF THE BASIN 18/

(a) Wills Creek. Tributary to Potomac River.

1. Source:---In Larimer Township, southeastern Somerset County.

2. Course:---Northwesterly and easterly into Bedford County to Hyndman; thence southerly into Maryland to Potomac River at Cumberland, crossing State boundary at State Line, elevation 736.

3. Length:---In Pennsylvania, twenty-seven miles along stream.

4. Drainage Area:---Contains 186.6 square miles, in southeastern Somerset and southwestern Bedford counties, of mountainous country. The main stream cuts through Savage Mountain and another ridge entering a valley flanked by ridges, Wills Mountain being the eastern slope, which it follows to the State boundary. Sandstone and limestone formations containing some coal predominate.

5. Discharge:---No records available.

(b) Evitts Creek. Tributary to Potomac River.

1. Source:---In Cumberland Valley Township, near Burning Bush, southern central Bedford County.

2. Course:---Southwesterly into Maryland to Potomac River near South Cumberland. The stream crosses the State boundary at elevation 776.

3. Length:---In Pennsylvania, seventeen miles along stream.

4. Drainage Area:---In Pennsylvania, 80.0 square miles of southwestern Bedford County. The topography is mountainous, the main valley lying between the parallel ridges of Wills and Evitts mountains. Geologic formations are sandstone and limestone.

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18/ Source for all except discharge data-Water Resources Inventory Report, Part III, Gazetteer of Streams. Pennsylvania Water Supply Commission-Harrisburg, Pennsylvania, 1916. Discharge data:-Pennsylvania Department of Forests and Waters and U. S. Geological Survey. - Harrisburg, Pennsylvania. "c.s.m." means cubic feet per second per square mile of Drainage Area.

5. Discharge:---Gaging station near Bedford Valley, Pennsylvania.

Drainage area above station, 30.2 square miles.

Records available, September 1932 to September 1936.

| | |
|---|---|
| Maximum Discharge (March 17, 1936) | 173.5 c.s.m. |
| Minimum Discharge (July 27, 1934) | .04 c.s.m. |

(c) Town Creek. Tributary to Potomac River.

1. Source:---Formed by junction of Wilson Run and Bushy Fork, in Southampton Township, southern Bedford County.

2. Course:---Southwesterly into Maryland, crossing State boundary at elevation 816; thence southerly to Potomac River near Okonoko, Maryland.

3. Length:---In Pennsylvania, ten miles along stream.

4. Drainage Area:---In Pennsylvania, 80.4 square miles in southern Bedford County of mountainous region. The mountainous ridges bounding the drainage area on the east and west are from 10 to 15 miles apart, the intervening country being rough and broken. Sandstone and limestone formations predominate.

5. Discharge:---No records available.

(d) Sideling Hill Creek. Tributary to Potomac River.

1. Source:---Formed by junction of East and West Branches, in Mann Township, southeastern Bedford County.

2. Course:---Southeasterly through Fulton County into Maryland, crossing the State boundary at elevation 636; thence southerly to Potomac River near Lineburg, Maryland.

3. Length:---In Pennsylvania, five and one-half miles along stream.

4. Drainage Area:---In Pennsylvania, 70.4 square miles in southeastern Bedford and Southwestern Fulton counties of broken mountainous country.

Geologic formations are shale and sandstone.

5. Discharge:---No records available.

(e) Great Tonoloway Creek. Tributary to Potomac River.

1. Source:---In Brush Creek Township, western Fulton County.

2. Course:---Southeasterly, by a circuitous route, into Maryland, crossing the State boundary at elevation 422; thence southerly to Potomac River, one mile east of Hancock, Maryland.

3. Length:---In Pennsylvania, nineteen and one-half miles along stream.

4. Drainage Area:---In Pennsylvania, 119.5 square miles in southwestern Fulton County of mountainous country containing narrow valleys flanked with steep hills, some of which rise to mountain ridges. Formations are shale and sandstone.

5. Discharge:---No records available.

(f) Licking Creek. Tributary to Potomac River.

1. Source:---In Todd Township, northeastern Fulton County.

2. Course:---Southwesterly to Knobsville; thence westerly and southerly into Franklin County; thence southeasterly into Maryland, returning to Pennsylvania and again crossing boundary into Maryland, at elevation 448; thence southerly to Potomac River near Ernstville, Maryland.

3. Length:---In Pennsylvania, thirty-five miles along stream.

4. Drainage Area:---In Pennsylvania, 177.0 square miles in eastern Fulton and southwestern Franklin counties of mountainous country with narrow valleys. Geologic formations are shale, sandstone and limestone containing coal.

5. Discharge:---Gaging station near Sylvan, Pennsylvania.

Drainage area above station, 158 square miles.

Records available, June 1930 to September 1936.

Maximum Discharge (March 18, 1936) 131.01 c.s.m.

Minimum Discharge (August 8, 1930) .02 c.s.m.

(g) Conococheague Creek. Tributary to Potomac River.

1. Source:---In Menallen Township, northwestern Adams County; elevation 1,465.

2. Course:---Westerly, by a circuitous route to Chambersburg; thence southwesterly to junction of Back Creek at Williamson; thence southerly, into Maryland to Potomac River at Williamsport, Maryland.

3. Length:---In Pennsylvania, fifty-six miles along stream.

4. Drainage Area:---Total, 197.4 square miles; in Pennsylvania, 197 square miles in western Franklin County. The topography is mountainous in headwaters and upper basin; the lower basin lies in the broad, fertile Cumberland Valley. Geologic formations are shale and sandstone.

5. Discharge:---No records available.

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENT

(a) Navigation:---There are no navigable streams in the Basin and no projects for navigation are contemplated. Existing transportation facilities appear to be adequate.

(b) Flood Control:---Flood control in the Potomac Sub-Basin is not of major importance. Chambersburg, Hyndman and several smaller towns are subject to flood damages of a minor nature.

(c) Municipal, Domestic and Industrial Supplies:---The yearbook of the Pennsylvania Department of Health, for 1934 (unpublished) tabulates information on public water works in Pennsylvania as of May 31, 1934, where water is treated.

Computations made on the basis of data from this report indicate that 40,000 persons or approximately 69.6 per cent of the population (1934) of the Potomac Basin in Pennsylvania residing in communities 19/ was served with treated water, either filtered, chlorinated, or both.

Complete data are not available concerning places having untreated supplies. It is known, however, on the basis of the report of the Pennsylvania Water Supply Commission (1916) that 1 community, Hyndman, in the Basin is served by untreated public supplies. The 1930 population of this place was 1280 or about 2 per cent of the Basin's community population. It is assumed that those places not listed as served by any of the supplies mentioned derive their supply from private wells and springs or possibly from industrial supplies.

A tabulation of all cities and boroughs in the Basin together with

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19/ See Table X. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-McNally and Company.

unincorporated places within Townships, having population of 500 or more, is contained in Appendix A. This tabulation lists for each community the status of water supply and such additional information as is now available from data in the files of the State Planning Board.

1. Filtered Supplies:---The Department of Health Report lists 2 communities in the Basin served by public water supply filtration plants. The population served comprises 7,000 people or about 12.2 percent of the population (1934) of the Basin residing in communities. 19/.

2. Chlorinated Supplies:---The same report lists 11 communities in the Basin served by public water supplies without filtration plants, but equipped with chlorination plants. These serve 33,000 people or approximately 57.4 percent of the population (1934) residing in communities. 19/.

3. Industrial Supplies:---At the present time there is no State Department having jurisdiction over industrial water supplies and no complete up-to-date data concerning them are available. The Water Resources Inventory Report of the Water Supply Commission (1916) listed industrial supplies, but these data are considered obsolete.

In general, industries requiring water in quantity are located along the main streams of the Basin and derive their supplies from them. No information regarding the adequacy of these supplies is available.

(d) Irrigation:---None of importance known.

(e) Water Power:---

1. Mechanical:---The report of the Pennsylvania Water Supply Commission (1916) stated that there were 62 mechanical water plants in the Basin; none of which developed 100 horsepower or over.

2. Hydro-Electric:---There are no Hydro-Electric plants in the Basin developing over 100 horsepower.

(f) Drainage:---None of importance known.

(g) Recreation and Wild Life:---Counties mainly in the Basin (Fulton and Franklin) now contain 78,984 acres of State owned land. Of this, 68,113 acres is State Forest Land, while the remaining 10,871 acres is owned by the Game Commission.

In this same area are 751 acres of park and recreation land. This includes 401 acres of State owned land and 350 acres of privately owned land 20/. This area of recreational land is considered inadequate and recommendations have been made 20/ for the future acquisition of an additional 700 acres of park and recreational land and 40,906 acres of Government owned forest land.

The Pennsylvania Fish Commission is conducting a program of stream improvement utilizing W.P.A. and C.C.C. labor for the smaller unpolluted streams where flood hazards to such developments are not too great. In this basin such programs are underway in Adams, Bedford and Franklin counties 21/. The Fish Commission is also restocking unpolluted streams with game fish.

(h) Correlated Uses:---None so far as is known.

(i) Imported and Exported Water Supplies:---The Evitts Creek Water Company has its storage reservoirs on Evitts Creek, in Bedford County, and exports approximately 6,600,000 gallons daily to Cumberland, Maryland, where it is used as a domestic supply for 35,000 consumers.

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20/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania, 1934. Pages 170-172.

21/ Map showing counties where stream improvement work has been approved - applications filed - November 15, 1935. Pennsylvania Board of Fish Commission, Harrisburg, Pennsylvania.

## V UNDERGROUND WATER 22/

(a) Extent of Area and Supply:---Groundwater occurs in two types of openings - pore spaces and joints and crevices.

The geologic formations from which the majority of groundwater supplies of the Potomac Basin are derived, listed in order of their importance are:-

1. - Cambrian, Canadian and Ordovician limestones and dolomites. (In solution channels).

2. - Triassic sandstones, shales and conglomerates.

3. - Martinsburg shale.

4. - Cambrian quartzites and related rocks.

5. - Pre-Cambrian crystalline rocks.

There are maps available showing the distribution of these formations in the Basin as well as the location of wells, on which data are available, giving depth and descriptions of the water bearing materials. 22/.

Groundwater is generally available throughout the Basin and is extensively used as a source of domestic supply.

(b) Character or Quality:---The amounts of dissolved mineral matter in waters from different members of the various geologic formations in the Basin differ widely.

In general, the water from the limestones and dolomites is hard but contains only small amounts of dissolved iron. The waters from the Triassic sandstones, shales and conglomerates varies from hard to soft, but the average hardness is less than that of the limestone waters. The waters from the Martinsburg shales are much softer than those from the limestones,

22/ Information from "Ground Water in Southeastern Pennsylvania", by George M. Hall, U. S. G. S. Bulletin W-2. Pennsylvania Geological Survey, Harrisburg, Pennsylvania, 1934. The area covered by this report is not contiguous with the Basin. The counties referred to are Adams and Franklin.

but are not as soft as the waters from the Cambrian quartzites.

Data derived from the analysis of samples from individual wells throughout the area are available. 22/.

(c) Economic Availability:---The extent of present use would indicate that groundwater is economically available for domestic and industrial water supplies in the Potomac Basin.

(d) Extent of Use:---The report of the Pennsylvania Department of Health of 1934 lists 4 communities which have water works serving 3,893 persons which use wells and springs as a source of supply. The report also lists 2 communities which have water works serving 3,300 persons which use wells and springs as a partial source of supply.

The population served groundwater exclusively is estimated to be roughly 9 percent of the population residing in communities (1934). The population served part groundwater and part river and creek water is estimated to be roughly 7 percent of the population residing in communities (1934). Many persons not residing in communities depend upon groundwater derived from private wells and springs as a source of domestic supply.

(e) Prospective Uses:---Since the temperature of groundwater tends to be approximately that of the mean annual temperature of the atmosphere of the locality, it is particularly well adapted for industrial use as cooling water.

It would appear that groundwater would continue to serve as a source for small domestic supplies since it requires little treatment and relatively inexpensive water works.

Groundwater is particularly well suited for use in air-conditioning

installations, and large quantities may be demanded for this purpose, especially during the summer months. The period of maximum demand, for groundwater for this purpose would, however, coincide with the period during which the groundwater table is at the lowest level. 23/

23/ Remarks by Dr. George H. Ashley, State Geologist in conference on Drainage Basin Study with Mr. Weed. June 9, 1936.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

Pollution of streams is not a major problem in the Basin.

(a) Sewage:---The Pennsylvania Department of Health submitted a report to the Pennsylvania State Planning Board in March 1935 which listed in the Potomac Basin 2 communities having sewage treatment works. These communities, Gettysburg and Chambersburg, had an estimated combined population (1934) of 19,548 persons 24/ or about 34% of the Basin's community population. Sewage treatment plants are also maintained at the Mount Alto Sanitarium, The United Brethren Home and Orphanage at Quincy, and the Pennsylvania Soldiers' Orphans' Home at Scotland.

The same report listed 2 communities, Hyndman and Waynesboro, which have public sewers but no sewage treatment works. The combined population of these two communities in 1934 was 11,014 or about 19% of the Basin's community population.

Plans have been approved by the Pennsylvania Department of Health for a sewage treatment plant at Waynesboro. This plant is partially constructed. Orders have been issued by the Department of Health to Hyndman for the construction of a primary sewage treatment plant. At the present time 50,000 gallons of raw sewage per day is being discharged into Little Wills Creek by this community.

A tabulation of all cities and boroughs and unincorporated places (having a population of over 500) within townships in the Basin is included in Appendix B.

This tabulation lists for each community the status of sewage disposal and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

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24/ See Table X. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-McNally and Company.

(b) Trade Wastes:---Data in the files of the Pennsylvania Department of Health indicates that in April 1932 there were 17 industrial plants discharging industrial wastes into the tributaries of the Potomac River. These plants were classified as follows:-

Gas Manufacturing Companies:- 1 on Rock Creek; 1 on Little Antietam Creek; and 1 on Conococheague Creek. All of these plants have separators for tar removal.

Daries:- 1 on Marsh Creek; 1 on Big Cove Creek; and 1 discharging wastes into four wells which drain into the West Branch of Conococheague Creek.

Canneries:- 1 on Marsh Creek; 1 which has primary treatment for its wastes discharging them into the West Branch of Conococheague Creek.

Mines:-6 small workings which discharge drainage into Rush Run and Jennings Run. These mines are small and will probably be exhausted and abandoned within several years.

Tanneries:- 1 mineral process tannery discharging wastes into West Branch of Conococheague Creek.

Slate Processing Plants:- 2 discharging slate dust into Toms Creek.

(d) Silt and Erosion:---The Soil Conservation Service has prepared an erosion map of the State 25/ which is on file with the Pennsylvania State Planning Board. According to this map erosion is widespread throughout the Basin. Probably 60 percent of the area is subject to "Moderate sheet erosion" and "Moderate sheet erosion with occasional gullies".

The amount of silt carried by the streams of the Basin is not known.

(e) Irrigation and Drainage:---None of importance known.

25/ Reconnaissance Erosion Survey of Pennsylvania, May 1935 - U. S. Department of Agriculture Soil Conservation Service - Washington, D. C.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:--- There are no navigable streams, no navigation projects either present or contemplated within the Basin in Pennsylvania.

(b) Flood Control:--- This is not a major need of the Potomac Basin. Flood damages are generally of a minor nature and are not of frequent occurrence. Chambersburg is subject to minor flood damage from the Conococheaque Creek.

The Limestone formations of the drainage area of Conococheaque Creek contain many solution channels which normally carry off a great amount of the rain-fall thus reducing the run-off. However, at times of prolonged rains, when the solution channels become filled to capacity the run-off approaches 100% and floods occur.

Hyndman and other communities along Wills and Little Wills Creek are subject to occasional floods. High run-off is caused by the mountainous nature of the country, and the resulting flood stages cause minor damage at various points along the stream. No studies for remedial measures have been made by the Pennsylvania Department of Forests and Waters.

(C) Municipal, Domestic and Industrial Supplies:--- The Pennsylvania Department of Health in a report to the Pennsylvania State Planning Board in March 1935, listed 6 communities in the Potomac Basin, having a combined population of 2,689 persons, (1934 estimated population) now depending on private wells and springs as a source of supply, which it felt have public water supplies.

The same report listed 6 communities, having a population (1934) of 10,465 persons or about 18 percent of the Basins' population, already equipped with public water supplies but where improvements to water works

are needed. Orders have been issued by the Department of Health to 2 of these communities, having a population of 1,232 (1934), for improvements.

(d) Irrigation:--- Irrigation is not considered a need at present.

(e) Water Power:--- Due to the proximity of the bituminous coal fields, it is not probable that any large scale water power projects will be undertaken in the Basin, and there are no contemplated projects known.

(f) Drainage:--- None of importance known.

(g) Recreation and Wild Life:--- Recommendations contained in the Preliminary Report of the Pennsylvania State Planning Board call for the future acquisition of 16,887 acres of State Forest Land, 24,019 acres of State Game Land, and 700 acres of State Park Land.

State Game Land:--- Game land is being acquired at the rate of 75,000 acres per year for the whole State. If this rate of acquisition is maintained, it will require 8 years to acquire the recommended acreage. Funds for the acquisition of this land comes from hunter's licenses and it has been recommended that this program be allowed to proceed undisturbed.

State Forest Land.

| | |
|---|---|
| Total future recommended acquisition | 16,887 acres |
| 25% for immediate acquisition | 4,222 acres |
| Cost of land @ $6.00 per acre (minimum) | $25,332.00 |
| Cost of land @ $10.00 per acre (maximum) | $42,220.00 |
| Cost of Stocking @ $10.00 per acre (2,815 acres) | $28,150.00 |
| Minimum cost for immediate acquisition and stocking | $53,482.00 |
| Maximum cost for immediate acquisition and stocking | $70,370.00 |

Basis of Estimate:--- Figures prepared by the Pennsylvania Department of Forests and Waters are used in estimating the probable cost of development.

Land:---$6.00 to $10.00 per acre. (The Department is limited by law to a maximum of $10.00 per acre).

Planting Costs:--- $6.00 per acre.

Nursery Costs:--- $3.60 per acre (say $4.00).

It is expected that some of the land acquired will not require reforesting and the proportion to be planted is assumed at about two-thirds.

Dr. E. A. Zeigler of the Department of Forests and Waters recommends consideration of 25% of the total area recommended for immediate acquisition and development and the balance for later consideration so that the program could be continued over a number of years. This is desirable since present nursery facilities are not adequate to supply the demand of such a large program and would have to be enlarged.

Planting stock requires from 2 to 4 years to be developed.

As acquisition progresses land would no doubt increase in price advancing the cost from the low toward the higher figure. Such a program might be considered to cover a two year period so that the entire program might be carried out in a period of 8 years. This would coincide with the rate of acquisition of game lands now underway.

Proposed Detailed Study:---Act No. 47, 1936 Speical Session General Assembly of Pennsylvania provided for a detailed survey of the location, availability and approximate purchase price of all private forest and abandoned farm land in the State. This survey will furnish desirable information for the future acquisition of State Forest land.

(h) Rectification of Existing and Prevention of Future Contamination:---

The pollution of Little Wills Creek by sewage discharges at Hyndman is the major pollution problem of the Basin. Although orders have been issued for the installation of a primary treatment plant, actual construction has been delayed presumably because of financial difficulties. A secondary treatment plant is needed at Gettysburg; plans have been prepared but no actual construction has taken place.

The majority of industrial plants discharging wastes into the streams of the Basin are cooperating with the Department of Health in treating their wastes. However, there is a decided need for continued research to determine practical methods for the recovery of useful by-products from and for the adequate treatment of many trade wastes.

Such studies can be undertaken by only a few individual companies because of the expense involved. Research by competent technicians financed by trade associations or by public funds would seem to be the most practical means of gaining the knowledge necessary to make possible the abatement of such pollution.

GENESEE RIVER BASIN

UPPER CHESAPEAKE BAY BASIN

## GENESEE BASIN

The Pennsylvania portion of the Genesee River Basin occupies an area of 96.0 square miles in northern Potter County. The topography is composed of rough and hilly country with narrow valleys lying between steep hills. Geologic formations are shale and sandstones. Approximately 35 per cent of the Basin is forested.

The mean annual precipitation varies from 30 to 39 inches. Snowfall is moderately heavy, averaging about 50 inches per year. The mean annual temperature is 48 degrees.

The population of the Basin has declined from 3,622 in 1900 to 2,112 in 1930, or approximately 41 per cent. Lewisville, the only boro, had a population of 514 in 1930 and 620 in 1900.

Agriculture is the chief occupation in the Basin. Approximately 65 per cent of the area is in farm land. According to the Land Utilization Map, Figure II, the eastern portion of the Basin is composed largely of "Superior Farm Land" while the western portion is largely "Below Average Farm Land" and forest land.

The Genesee River rises in Ulysses Township, northeastern Potter County, and flows northwesterly into New York; thence northwesterly and northeasterly to Lake Ontario. Its length, along stream, in Pennsylvania is eleven miles. No stream flow records are available for the portion in Pennsylvania.

There are two public water supply systems in the Basin. The one

serves chlorinated well water to 550 persons at Lewisville, the other, serving Genesee and Hickox villages, utilizes untreated spring water. There are no projects listed for water supplies.

There are no sewered communities in the Basin, and no projects for sewers or disposal plants are contemplated.

Existing water developments appear to be adequate to meet the needs of the Basin. Because of the smallness of the area and its sparse population, and because of the absence of water use problems, no comprehensive plan has been outlined for the development of the Basin's waters in Pennsylvania. In order that the down-stream communities, located in New York State, may make the best use of the Genesee River, the headwaters in Pennsylvania should be maintained in a relatively clean and unpolluted condition.

The Pennsylvania portion of the Chesapeake Bay Drainage Basin consists of three small sections having a combined area of 85.3 square miles. The largest of these is a triangular shaped area of 66.4 square miles located in southeastern Chester County and drained by head water streams of Elk River. The other two areas are located in southern York County. The one, drained by Northeast River, contains 7.5 square miles; the other, drained by Gunpowder Falls, contains 11.4 square miles. The location of these areas and their relation to adjoining drainage basins is shown by the Frontispiece.

The mean annual precipitation for the sections in York County is from 35 to 39 inches and for the Chester County section from 40 to 44 inches. The mean annual temperature is 54 degrees.

The population of the Basin decreased from 6416 in 1900 to 6217 in 1930. The population density in 1930 was 73 per square mile. The population of Oxford, the only boro, increased from 2030 in 1900 to 2606 in 1930.

The rural farm population in 1930 was 2759. According to the Land Utilization Map, Figure III, the portions of the Basin in York County are composed of "Above Average Farm Land" and the portion in Chester County varies from "Average Farm Land" to "Superior Farm Land". Agriculture and Manufacturing are the main occupations.

Big Elk Creek, a tributary of Elk River, is formed by the junction of the East and West branches, 3.5 miles east of Oxford, Chester County; elevation 318 feet. It flows southeasterly into Maryland; thence southerly to Elk River. Its length along stream, in Pennsylvania, is 8 miles. The topography is rolling agricultural country. The main valley narrows

near the junction of the branches and is flanked with steep hills to the State boundary. Geologic formations are slate and gneiss. No stream flow records are available for the portion of the stream in Pennsylvania.

There is only one public water supply system in the Basin. Chlorinated well water is served to 2600 persons at Oxford. This boro also has the only public sewer system in the Basin, but has no sewage disposal plant.

Existing water developments appear to be adequate to meet the needs of the Basin, and no major water use problems exist. No comprehensive plan has been outlined for the development of this Basin's waters in Pennsylvania. The stream should, however, be kept in a relatively unpolluted condition in order that the portion of the Basin in Maryland may make the best use of the river system.

# CONCLUSIONS AND PROJECT LIST

FOR

SUSQUEHANNA RIVER BASIN IN PENNSYLVANIA

AND

POTOMAC RIVER BASIN IN PENNSYLVANIA

# VIII COMPREHENSIVE PLAN FOR DEVELOPMENT OF WATER RESOURCES

## SUSQUEHANNA RIVER BASIN

The various economic interests of the Susquehanna Basin have created many interrelated problems relative to the use, control and conservation of both surface and ground waters. Within the Basin are located large industrial centers, bituminous and anthracite coal fields of national importance, gas fields, rich agricultural and dairying areas, extensive networks of transportation systems, and large areas of second growth forest land - all vitally concerned with the present and future utilization of water resources. Within the Basin are located portions of three states - New York, Pennsylvania and Maryland - all having major interests in the development of water resources. Within the Basin are many water users - municipalities, manufacturing plants, coal mines, power generation stations, railroads, water supply companies, recreational areas, farms and individuals - each with its individual investments arrayed in an orderless, unintegrated maze of water developments. And within the Basin are the water and health engineers of three states - implemented with three separate systems of controlling legislation - attempting to administer the statutes of their particular states in an equitable manner to all water users, and to the best interests of the individual states.

The uncoordinated development of water resources, perhaps benefiting localized communities and industries, restricts the potential development of these resources and prevents the use of the river system in a manner conducive to the greatest measure of general welfare to the three states and the Susquehanna Basin as a whole. The uncoordinated consumma-

tion of a specific water development may result in injury to existing developments on the same stream and prevent future ones. The solution to a particular water problem in one locality may create new and greater problems at other locations.

The supply of water for essential purposes is strictly limited, and soon or later the maximum dependable supply of water in the Susquehanna Basin must be put to its best use in order that this region may retain its present state of cultural development and be in a position to compete successfully with other areas. Due to the multiplicity of interests involved it is evident that an integrated and comprehensive plan for the development of the Susquehanna Basin is essential to the equitable use and effective control and development of its water resources.

With the years, the need for effective cooperation between the states in matters of use and protection of and from the waters of the Susquehanna River Basin has become more acute and more widely understood. The handling of an interstate stream such as the Susquehanna River requires the active cooperation of the interested states, both in the formulation of plans and in the adoption and administration of regulations.

A comprehensive plan for the development and conservation of the water resources of the Susquehanna River Basin in Pennsylvania is properly to be based upon the future use and occupancy of the Basins' lands. The water plan will be one part of the Master Plan for the area and for the State and, consequently, should be evolved as an integral part of the Master Plan. While it is not possible to formulate a really comprehensive plan for development of water resources in advance of the Master Plan, a program of development consisting of certain projects proposed by various agencies, the need for which has been made evident by this study, can be outlined.

The major projects under their various general headings are discussed in this section. Section IX is a complete list of all projects, the locations of which are shown in Figure I. (Project Map)

(a) Navigation:---Existing means of railroad and highway transportation adequately serve the Susquehanna River Basin and there is no real need for inland waterways. No navigation projects are recommended for the present or near future.

(b) Flood Control:---The most urgent problem of the Susquehanna River and its tributaries is the control of floods. Floods occurring at frequent intervals have caused great property damage throughout the Basin. In 1935 a destructive flood occurred in the head waters of the River. In 1936 the lower reaches were inundated by the greatest flood of record. Floods of lesser magnitude occurred in the years 1865, 1889, 1894, 1901, 1902, 1913, 1914, 1933 and 1934, and in intervening years, the lowlands along the Susquehanna and its tributaries were periodically flooded. Property damages suffered by public and private interests in the 1935 flood have been estimated at $16,773,700 and in the 1936 flood between $60,000,000 and $72,000,000.

Funds have been allotted by the War Department for the construction of levees for the protection of Wilkes-Barre, Hanover Township, Kingston and Edwardsville.

The Corps of Engineers, United States Army, is preparing detailed plans of levees for the protection of Bloomsburg, Forty-Fort, Harrisburg, Jersey Shore, Lock Haven, Milton, Montgomery, Muncy, Nanticoke, Sunbury, Swoyersville, West Pittston and Williamsport. It is also making surveys and studies of the northern part of Pennsylvania and southcentral New York

to determine locations and costs for flood control reservoirs on the upper reaches of the Susquehanna River.

Channel improvements have been made in Codorus Creek for the protection of York, and studies have been made for flood control reservoirs along this stream.

Some degree of local protection may be secured by the construction of levees and stream improvements at the locations referred to above. The construction of flood control reservoirs on the upper reaches of the Susquehanna River system would provide some degree of flood control. Until the surveys and studies now being made by the Corps of Engineers, United States Army, and the State Department of Forests and Waters are completed, it will not be possible to estimate the reduction of flood damages which may be obtained through economically feasible flood control and protection works.

Many structures now subject to flood damages could have been located on higher ground above the danger zone. The construction of flood control and flood protection works may create a false sense of security and result in further undesirable developments on the flood plains, thereby increasing flood damages rather than diminishing them.

The best plan for flood protection and control will consist not only of flood control reservoirs at the headwaters, levees and channel improvements for local protection but also of intelligent zoning of the flood plains.

It is recommended that the present flood control and protection surveys and studies be completed, in order to determine to what extent control would be economically justified. It is further recommended that channel lines be established in all areas subject to serious floods, and that local zoning be adopted to prohibit the erection of certain types of

structures in areas subject to such floods which cannot be adequately and economically protected by flood control or protection works. It is recommended that such zoning ordinances provide for the gradual elimination of non-conforming uses from flood areas.

Additional hydrological data are needed for many streams of the Basin. The installation of additional hydrological gauges for determining stream flow characteristics is highly desirable.

(c) Municipal, Domestic and Industrial Supplies:---Municipal water supply is not a major problem in the Basin. The majority of communities obtain their supplies from upland streams, creeks, wells and springs. Harrisburg and Steelton obtain their supplies of relatively hard water from the main stem of the river and at times of low flow treatment is difficult. The municipal plant at Harrisburg is subject to damage and curtailment of supply during flood stages of the river. A study project is recommended for the metropolitan Harrisburg area to determine the advisability of developing an upland source of relatively pure soft water.

The use of ground water has been increasing during past years. Since there are few data available concerning ground water in the Basin, it is desirable that a study be made to determine its extent and areas of supply. Such a study would, especially in the northern part of the Basin, be useful for flood control studies.

Many of the smaller communities in the Basin now without public water supplies should have such facilities. In the limestone areas, and in particular in the eastern portion of Cumberland County, pollution entering solution channels is carried by underground water to many of the limestone springs and wells. It is desirable that clean public water supplies

be provided for such communities in the near future. Section IX, Project List, lists these communities and, in addition, extensions, improvements and chlorination apparatus needed for many existing public water supply systems.

(d) Irrigation:---No irrigation projects are included in the plans for the comprehensive development of the Basin.

(e) Water Power:---The Susquehanna River is a source of great potential power. Its location with respect to the great industrial and manufacturing centers of eastern Pennsylvania, southern New York, New Jersey and Maryland provides an extensive market for power. Present installations on the Susquehanna River total 630,000 kilowatts capacity, of which more than 455,000 are in the Pennsylvania portion. The plants at Holtwood and Safe Harbor on the lower end of the river have a combined capacity of 413,200 kilowatts with provisions for additional units.

The operation of hydro-electric plants will be improved by the regulation of stream flow. Although no power projects are recommended for immediate construction, the construction of a plant on the Raystown Branch, contained in the Project List, should await the development of markets for such power. Hydro-electric development should be carefully planned and coordinated with stream flow regulation, steam power and markets.

(f) Drainage:---No drainage projects are recommended for present or future construction.

(g) Recreation and Wild Life:---The Susquehanna River Basin contains many excellent sites susceptible to development for parks and recreational sites.

There is a definite need for facilities of this type in the Basin. Preliminary recommendations have been made by the Pennsylvania State Planning Board for the acquisition of approximately 186,000 acres of land for game refuges and hunting ground, and for 1,600,000 acres of additional State Forest Lands.

A study project is recommended for determining the locations and needed acreage for State Park uses. The acquisition of from 5,000 to 6,000 acres of land at Ricketts Glen, and its development for recreational use will be desirable in the future.

(h) <u>Rectification of Existing and Prevention of Future Contamination</u>:--- Pollution of the Susquehanna River and its tributaries is a major problem of the Basin. While most of the pollution is caused by the discharge of untreated sewage and mine wastes, certain industrial wastes also interfere with the use of the waters. Fish and other aquatic life is menaced or absent in many of the streams, and in many places the water is unsafe for recreational use.

Statistics indicate that most of the municipalities in the Basin discharge untreated sewage into the streams. It is recommended that sewage treatment plants be constructed by the offending communities as soon as possible, and that industries be required to treat their wastes.

Prior to the intensive industrial development of the Basin, the diluting property of the streams and the natural purification processes were sufficient to take care of sewage and trade wastes without considerable nuisance or hazard. Communities and industries were permitted to use the waters from the streams with little or no restriction. Sewage outfalls were located at the down-stream limits of communities, and water for municipal supply was taken at or above the up-stream limits. As the industrial

development of the Basin progressed, however, and as the density of population increased, a point was long since reached where the amount of polluting matter discharged into the streams was too great for correction by natural purification processes, with the result that many of the Basin's waters are now greatly polluted.

The residents of communities which discharge their sewage below the community limits are likely to be opposed to the expenditure of funds for the construction of sewage disposal plants which will benefit all the communities on the stream below them but which will be of little or no benefit to the community for which the plant is proposed. Since sewage constitutes a large portion of the pollution, industries are reluctant to install treatment facilities for their waste products before sewage pollution is abated and oppose any plans which would compel them to do so. Such attitudes are understandable. Nevertheless, it must be recognized as being important to the welfare of the general public that the right to use water from the streams of the Basin should include the responsibility for returning it to the streams in a reasonably unpolluted and usable condition.

The Sanitary Water Board administers the laws dealing with the pollution of the waters of the State, 26/ which include those sections of the Purity of Waters Act of 1905 dealing with the discharge of sewage, section 200 of the Fish Laws of 1925 dealing with the discharge to State waters of substances harmful to fish and aquatic life; and those sections of the Rules and Regulations dealing with the discharge of organic wastes to State Waters. Permits for the construction of sewers and sewage dis-

26/ The LaRue Stream Pollution Bill, passed by the Legislature during the 1937 session, materially strengthens existing legislation. This act prohibits any pollution of waters in the State by sanitary or industrial waste and provides for severe penalties for non-compliance. This act will be administered by the Sanitary Water Board.

posal plants are likewise issued by this Board.

This Board has long campaigned for the abatement of pollution, but has lacked strong supporting legislation. Dealing with trade wastes, it has worked largely on a cooperative basis, with considerable success.

In administering them, however, the Sanitary Water Board is confronted with obvious difficulties in their immediate strict enforcement due to the time required and the difficulties encountered in financing and constructing the necessary treatment plants.

The advisability of controlling pollution by combining water-use permits with sewage and trade waste permits is one suggestion which might prove effective in operation. Such a plan might provide that no water be withdrawn from any stream or reservoir without a permit and that a fee be charged for all water used, dependent upon the amount of polluting matter added by the water user prior to its return to the stream. The fees collected might then be used for sewage treatment and other forms of pollution control and abatement.

Unfortunately, water supply and sewage disposal are usually considered to be entirely separate functions of municipal government. However, since pollution originates in water use, it appears logical that the cost of sewage treatment works be assessed against the water user. The inclusion of a charge for such treatment, in water bills, would go far in educating the public to the inter-relationship of water supply and sewage disposal and provide a fair apportionment of costs for sewage treatment works. It is believed that such a practice would reduce water waste and expedite the construction of sewage treatment plants by providing an additional method for financing them.

Most of the industrial waste in the Susquehanna Basin comes from coal mining: Acid Waters from operating mines and drainage from gob and culm banks flow into the streams together with large amounts of culm and silt. During times of low flow the culm is deposited in the stream beds, from whence it is purged during freshets and heavy rains. The only effective way of reducing such pollution is at the source. The sealing of abandoned bituminous mines, the installation of equipment for settling breaker water, the stabilization of culm and gob piles and the installation of equipment for treating industrial wastes of manufacturing plants would reduce greatly the amount of pollution being discharged into the streams. The control of erosion of both farm and forest lands would reduce the amount of silt carried by the streams and effect economies in all water uses throughout the Basin.

## POTOMAC RIVER BASIN

(a) Navigation:---There appears to be no need for any inland waterway in the Potomac River Basin in Pennsylvania, and no navigation projects are included.

(b) Flood Control:---Flood control is of minor importance in this Basin. Although Chambersburg, Hyndman and several smaller communities are subject to minor flood damages, there are no great floods on record. Cumberland, Maryland, which is located a few miles south of the Mason and Dixon Line, is subject to major damage from floods on Wills Creek and the Potomac River. Present plans for the protection of Cumberland propose the utilization of levees and diversion, but future studies may include a storage reservoir on Wills Creek in Pennsylvania.

(c) Municipal, Domestic and Industrial Supplies:---Water supply is not a major need of the Basin, as approximately 70 per cent of the community population is now served by public supplies. The Project List, Section IX, contains eleven projects for new public water supplies for communities dependent upon private wells and springs. Improvements to existing plants are listed for five other communities. Evitts Creek is utilized as a source of supply for Cumberland, Maryland; additional supplies can be developed on Evitts Creek to supply the needs of this city.

(d) Irrigation:---No irrigation projects are included in the plan for the development of this Basin.

(e) Water Power:---No hydro-electric plants are proposed for either immediate or future construction.

(f) Drainage:---Drainage is unnecessary in the Basin, and no projects are included.

(g) Recreation and Wild Life:---The amount of recreational land in the Basin is considered to be inadequate. Preliminary recommendations have been made by the Pennsylvania State Planning Board for the acquisition of 700 acres of park and recreational land and 40,906 acres of Government owned forest land. The acquisition of this land, and its development, would provide needed recreational facilities for the population residing in the Basin and adjacent to it.

(h) Rectification of Existing and Prevention of Future Contamination:---As indicated in Section VII-(h) the pollution of Little Wills Creek by sewage discharged by Hyndman is the major pollution problem of the Basin.

The construction of sewers and sewage disposal plants at Greencastle, Hyndman, Littlestown, McConnellsburg and Mercersburg, and a secondary treatment plant at Gettysburg would solve most of the pollution problems of the Basin. Industries are cooperating with the Pennsylvania Department of Health in treating their wastes, and pollution from this source has been greatly reduced.

## GENESEE RIVER AND CHESAPEAKE BAY BASIN

No major water problems exist in either the Genesee River or Chesapeake Bay Drainage Basins in Pennsylvania. Since the areas of these Basins in Pennsylvania are too small for any major water developments, and since these Basins contain no large communities, no comprehensive plans for development have been outlined for them. A sewage treatment plant should be constructed at Oxford Boro when ever the discharge of raw sewage at this point adversely affects down-stream communities located in the State of Maryland.

## IX PROJECT LIST

### Susquehanna Basin

The projects listed are recommended as a part of the comprehensive development of the Susquehanna Basin in Pennsylvania.

Information concerning these projects was obtained from various sources, including the Pennsylvania Department of Health, Sanitary Water Board, Pennsylvania Department of Forests and Waters, Drainage Basin Consultants for the National Resources Committee, United States Army Corps of Engineers Reports, National Inventory of Works Projects, and Public Works Administration.

Inasmuch as the time allotted did not permit the reporting agencies to make detailed cost analyses for many of the projects submitted, the information has been treated as advance confidential data. For this reason the name of the reporting agency is not included in the project list.

All information is as of September, 1936.

### GROUP I - IMMEDIATE CONSTRUCTION

Projects which are ready for construction, and should be undertaken as soon as possible.

FLOOD CONTROL

1. Kingston and Edwardsville, Luzerne Co., Pa. - Flood Control. Construction of levees on North Branch of Susquehanna River, as authorized by Act of Congress June 22, 1936. Estimated cost - $1,658,200.
2. Pennsylvania. - Flood Control. State-wide flood control study. No cost estimate available. $50,000 allotted to Water and Power Resources Board of Pennsylvania for such a study.

3. South Central New York and Northern Pennsylvania. - Flood Control. Study project for determining reservoir sites and other flood control works. Estimated cost - $600,000. Funds allotted by War Department for Survey now being made.

4. Sunbury, Northumberland Co., Pa. - Flood Control. Construction of levees on Susquehanna River, as approved by Act of Congress June 22, 1936. Estimated cost - $93,600.

5. Wilkes-Barre and Hanover Twp., Luzerne Co., Pa. - Flood Control. Construction of levees on North Branch of Susquehanna River, as authorized by Act of Congress June 22, 1936. Estimated cost - $2,129,400. Under construction.

POLLUTION ABATEMENT

6. Altoona, Blair Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant to replace existing plant which is inadequate. Estimated cost - $1,250,000.

7. Bedford, Bedford Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. Estimated cost - $170,000.

8. Clarks Summit, Lackawanna Co., Pa. - Pollution Abatement. Construction of a complete treatment sewage disposal plant and sanitary sewers. Estimated cost - $391,000.

9. Indiantown Gap, Lebanon Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant at the National Guard Camp. Estimated cost - $125,000.

10. State College, Centre Co., Pa. - Pollution Abatement. Construction of complete treatment sewage disposal plant. Estimated cost - $121,000.

MUNICIPAL WATER SUPPLY

11. Harrisburg and Vicinity, Dauphin Co., Pa. - Water Supply. Study to determine advisability of Water Supply Project for Harrisburg and Vicinity. No cost estimate available.

MISCELLANEOUS

12. Pennsylvania. - Hydrological Data. Installation of additional hydrological gauges for determining stream flow characteristics. No cost estimate available.

13. Pennsylvania. - State-wide. - Study project for determining method for preventing stream pollution by mine wastes. Estimated cost - $25,000.

14. Pennsylvania. - Study project of groundwater in Northern Pennsylvania, and extension of well gauging throughout entire State. Estimated cost - $84,000.

15. Susquehanna Basin. - Erosion Control. Program for erosion control to be carried out by U. S. Department of Agriculture in cooperation with State Agencies and Agricultural Interests. No cost estimate available.

16. Susquehanna Basin. - State Parks and Parkways. Study to determine locations and extent of needed future State Park facilities. No cost estimate available.

<u>GROUP II DEFERRED CONSTRUCTION</u>

Projects which, while desirable for immediate construction, (a) involve controversial questions, (b) can have their priority definitely determined only after additional studies which can not be completed in time for this report, or (c) are now obstructed by legal, administrative or other difficulties.

<u>FLOOD CONTROL</u>

17. <u>Bloomsburg, Columbia Co., Pa.</u> - Flood Control. Construction of levees on North Branch, Susquehanna River, as authorized by Act of Congress - June 22, 1936. Estimated cost - $131,300.

18. <u>Harrisburg, Dauphin Co., Pa</u>. - Flood Control. Construction of levees on Susquehanna River, as authorized by Act of Congress - June 22, 1936. Estimated cost - $104,000.

19. <u>Jersey Shore, Lycoming Co., Pa</u>. - Flood Control. Construction of levees on West Branch, Susquehanna River. Estimated cost - $395,900.

20. <u>Lock Haven, Clinton Co., Pa</u>. - Flood Control. Construction of levees on West Branch, Susquehanna River. Estimated cost - $2,860,000.

21. <u>Milton, Northumberland Co., Pa.</u> - Flood Control. Construction of levees on West Branch, Susquehanna River. Estimated cost - $263,900.

22. <u>Montgomery, Lycoming Co., Pa.</u> - Flood Control. Construction of levees on West Branch, Susquehanna River. Estimated cost - $139,100.

23. Muncy, Lycoming Co., Pa. - Flood Control. Construction of levees on West Branch, Susquehanna River. Estimated cost - $360,800.

24. Nanticoke, Luzerne Co., Pa. - Flood Control. Construction of levees on North Branch, Susquehanna River. Estimated cost - $381,700.

25. New York and Pennsylvania. - Flood Control. Construction of retarding dams in headwaters of Susquehanna and Delaware Rivers and Finger Lakes Region. Estimated cost - $27,154,000. Subject to revision upon completion of study now in progress by Corps of Engineers, War Department.

26. Plymouth, Luzerne Co., Pa. - Flood Control. Construction of levees on North Branch, Susquehanna River. Estimated cost - $728,000.

27. Swoyersville and Forty Fort, Luzerne Co., Pa. - Flood Control. Construction of levees on North Branch, Susquehanna River. Estimated cost - $529,800.

28. West Pittston, Luzerne Co., Pa. - Flood Control. Construction of levees on North Branch, Susquehanna River. Estimated cost- $100,000.

29. Williamsport, Lycoming Co., Pa. - Flood Control. Construction of levees on West Branch, Susquehanna River, as authorized by Act of Congress, June 22, 1936. Estimated cost - $2,444,000.

30. York, York Co., Pa. - Flood Control. Construction of retarding dams and reservoirs on Codorus Creek. Estimated cost - $2,210,000.

POLLUTION ABATEMENT

31. Canton, Bradford Co., Pa. - Pollution Abatement. Construction of a

sewage disposal plant. Estimated cost - $50,000.

32. Harrisburg, Dauphin Co., Pa. - Pollution Abatement. Construction of a complete treatment sewage disposal plant. Estimated cost - $1,200,000.

33. Huntingdon, Huntingdon Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. Estimated cost - $150,000.

34. Mt. Union, Huntingdon Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. Estimated cost - $120,000.

35. Nanticoke, Luzerne Co., Pa. - Pollution Abatement. Construction of a complete treatment sewage disposal plant. Estimated cost - $400,000.

36. Sayre, Bradford Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. Estimated cost - $160,000.

37. Spring Garden Township, York Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $794,500.

38. Tyrone, Blair Co., Pa. - Pollution Abatement. Construction of a sewer system and sewage disposal plant. Estimated cost - $180,000.

39. Wilkes-Barre, Luzerne Co., Pa. - Pollution Abatement. Construction of a complete treatment sewage disposal plant. Estimated cost - $391,000.

40. Williamsport, Lycoming Co., Pa. - Pollution Abatement. Construction of a complete treatment sewage disposal plant. Estimated cost - $700,000.

41. York, York Co., Pa. - Pollution Abatement. Construction of additional units to existing sewage disposal plant to provide adequate secondary treatment. No cost estimate available.

MUNICIPAL WATER SUPPLY

42. Greenwood, Blair Co., Pa. - Municipal Water Supply. Construction of water works and distribution system. Estimated cost - $136,000.

43. Lebanon, Lebanon Co., Pa. - Water Supply. Construction of needed facilities for increasing the capacity of the filter plant; repairs to water supply dams and improvements to watershed. No cost estimate available.

MISCELLANEOUS

44. Pennsylvania, State-wide. - Game Refuges. Acquisition of 200,000 acres of forest land for game refuges, public hunting grounds and future forest reserves. No cost estimate available.

45. Ricketts Glen Recreational Area. Luzerne Co., Pa. - Recreation. Acquisition and development of 5,000 to 6,000 acres of land for recreational purposes. Estimated cost - $425,000.

46. Susquehanna Basin. - State Forest Reserves. Acquisition of 1,600,000 acres of additional land for reforestation. No cost estimate available.

## GROUP III - INDETERMINATE CONSTRUCTION

Projects whose specific priority in the program is as yet indeterminate.

### POLLUTION ABATEMENT

47. Archbald, Lackawanna Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $265,700.

48. Blakely, Lackawanna Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $18,000.

49. Avis, Clinton Co., Pa. - Nuisance Abatement. Construction of a combined sewer system. Estimated cost - $100,000.

50. Bellefonte, Centre Co., Pa. - Pollution Abatement. Construction of additional sanitary sewers and a sewage disposal plant. No cost estimate available.

51. Bellwood, Blair Co., Pa. - Pollution Abatement. Construction of sanitary sewers and sewage disposal plant. Estimated cost - $225,000.

52. Carlisle, Cumberland Co., Pa. - Pollution Abatement. Extension of sanitary sewers. Estimated cost - $86,000.

53. Coalport, Clearfield Co., Pa. - Nuisance Abatement. Construction of a sanitary sewage system. Estimated cost - $10,000.

54. Curwensville, Clearfield Co., Pa. - Pollution Abatement. Construction of a sewage treatment plant. Estimated cost - $75,000.

55. Danville, Montour Co., Pa. - Pollution Abatement. Extension of sanitary sewers and construction of a sewage disposal plant. Estimated cost - $130,000.

56. Dewart and Goosetown, Northumberland Co., Pa. - Nuisance Abatement. Construction of a combined sewer system. No cost estimate available.

57. Dunmore, Lackawanna Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer trunk line. Estimated cost - $200,000.

58. Everett , Bedford Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $4,000.

59. Exeter, Luzerne Co., Pa. - Nuisance Abatement. Construction of a combined outlet sewer. Estimated cost - $25,000.

60. Fell Township, Lackawanna Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $16,000.

61. Frackville, Schuylkill Co., Pa. - Nuisance Abatement. Extension of sanitary sewers and purchase of private sewers. Estimated cost - $150,000.

62. Herndon, Northumberland Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. No cost estimate available.

63. Hopewell, Bedford Co., Pa. - Nuisance Abatement. Construction of sanitary sewer system. Estimated cost - $3,000.

64. Jersey Shore, Lycoming Co., Pa. - Pollution Abatement. Extension of sanitary sewers and construction of a sewage disposal plant. Estimated cost - $150,000.

65. Karthaus, Clearfield Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $20, 000.

66. LaPlume Township, Lackawanna Co., Pa. - Pollution Abatement. Construction of a new sewage disposal system. No cost estimate available.

67. Lock Haven, Clinton Co., Pa. - Nuisance Abatement. Construction of additional sanitary sewers. Estimated cost - $52,200.

68. Luzerne, Luzerne Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $200,000.

69. Manheim, Lancaster Co., Pa. - Pollution Control. Construction of a sewer system and sewage treatment plant. No cost estimate available.

70. Marion Heights, Northumberland Co., Pa. - Nuisance Abatement. Construction of a combined system and outfall sewer. Estimated cost - $123,400.

71. Mayfield, Lackawanna Co., Pa. - Nuisance Abatement. Construction of combined sewers. Estimated cost - $100,000.

72. Millerstown, Perry Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $2,500.

73. Milton, Northumberland Co., Pa. - Nuisance Abatement. Extension of sanitary sewer system. Estimated cost - $15,000.

74. Montgomery, Lycoming Co., Pa. - Nuisance Abatement. Extension of sanitary sewer system. Estimated cost - $2,500.

75. Moosic, Lackawanna Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $75,000.

76. Mount Carmel, Northumberland Co., Pa. - Nuisance Abatement. Construction of a combined trunk sewer. Estimated cost - $180,000.

77. Nippenose Township, Lycoming Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. Estimated cost - $15,000.

78. Old Forge, Lackawanna Co., Pa. - Nuisance Abatement. Construction of combined sewers. Estimated cost - $80,000.

79. Orbisonia, Huntingdon Co., Pa. - Nuisance Abatement. Construction of a combined sewer system. Estimated cost - $4,000.

80. Pittston, Luzerne Co., Pa. - Nuisance Abatement. Completion of sanitary sewer system. Estimated cost - $20,000.

81. Renovo, Clinton Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. Estimated cost - $35,000.

82. Scranton, Lackawanna Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $500,000.

83. Scranton Poor District, Lackawanna Co., Pa. - Pollution Control. Enlargement of sewage disposal plant. Estimated cost - $50,000.

84. Shamokin, Northumberland Co., Pa. - Nuisance Abatement. Extension of sanitary and combined sewers. Estimated cost - $24,000.

85. Shirleysburg, Huntingdon Co., Pa. - Pollution Abatement. Construction of a sewage treatment plant. No cost estimate available.

86. Throop, Lackawanna Co., Pa. - Nuisance Abatement. Extension of sanitary sewer system. Estimated cost - $100,000.

87. Watsontown, Northumberland Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $6,000.

88. West Hazleton, Luzerne Co., Pa. - Nuisance Abatement. Construction of a combined sewer. Estimated cost - $60,300.

89. West York, York Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $200,000.

MUNICIPAL WATER SUPPLY

90. Adams Co., Pa. - Water Supply. Construction of public water supply systems for the villages of Hampton, Hunterstown, Idaville and New Chester. No cost estimates available.

91. Alexandria, Huntingdon Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

92. Altoona, Blair Co., Pa. - Water Supply. Construction of a dam and reservoir on Allegheny Water Shed to augment present supply; diversion of Arble Run; construction of water mains, and miscellaneous improvements. Estimated cost - $1,781,000.

93. Antrim, Tioga Co., Pa. - Water Supply. Construction of reservoir. No cost estimate available.

94. Arnot, Tioga Co., Pa. - Water Supply. Construction of water supply system with chlorination apparatus to replace worn out system. No cost estimate available.

95. Arendtsville, Adams Co., Pa. - Water Supply. Installation of chlorination facilities and removal of occupied property from watershed above reservoir. No cost estimate available.

96. Ashville, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

97. Bakers Summit, Bedford Co., Pa. - Water Supply. Construction of a water line. No cost estimate available.

98. Barnesboro, Cambria Co., Pa. - Water Supply. Installation of an aerator and relocation of intake. Estimated cost - $2,500.

99. Beavertown, Snyder Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

100. Bedford, Bedford Co., Pa. - Water Supply. Installation of chlorination facilities for all sources of supply. No cost estimate available.

101. Bedford County, Pa. - Water Supply. Construction of public water supply systems for the boroughs of Coaldale, Hopewell, Manns Choice, New Paris, Pleasantville, St. Clairsville, Shellsburg and Woodbury; and the villages of Buffalo Mills and Fishertown. No cost estimates available.

102. Beech Creek, Clinton Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

103. Bellwood, Blair Co., Pa. - Water Supply. Reconstruct and enlarge reservoir. Estimated cost - $40,000.

104. Bethel, Berks Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

105. Biglerville, Adams Co., Pa.- Water Supply. Secure auxiliary source of supply. No cost estimate available.

106. Blossburg, Tioga Co., Pa. - Water Supply. Construction of a reservoir and installation of chlorination apparatus. No cost estimate available.

107. Blytheburn, Luzerne Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

108. Boalsburg, Centre Co., Pa. - Water Supply. Installation of a new chlorinator. No cost estimate available.

109. Byrnedale, Elk Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

110. Carlisle, Cumberland Co., Pa. - Water Supply. Improvements to filter plant and extension of water mains. No cost estimate available.

111. Carrolltown, Cambria Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

112. Catawissa, Columbia Co., Pa. - Water supply. Rehabilitate and further protect spring sources of supply. No cost estimate available.

113. Chest Springs, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

114. Chinchilla, Lackawanna Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

115. Crawford Township, Clinton Co., Pa. - Water Supply. Extension of water line. Estimated cost - $800.

116. Cross Fork, Potter Co., Pa. - Water Supply. Construction of a storage reservoir. Estimated cost - $5,000.

117. Curwensville, Clearfield Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

118. Cumberland Co., Pa. - Water Supply. Construction of public water supply systems for the villages of Centerville, Churchtown, Hogestown, New Kingston, Walnut Bottom and Newburg Borough.

119. Dallas, Luzerne Co., Pa. - Water Supply. Provide additional storage facilities. No cost estimate available.

120. Dalton, Lackawanna Co., Pa. - Water Supply. Rehabilitation of reservoir. No cost estimate available.

121. Danville, Montour Co., Pa. - Water Supply. Construction of a mixing basin for coagulation and repairs to filter plant. Estimated cost - $10,000.

122. Delta, York Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

123. Dublin Mills, Fulton Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

124. Duncannon, Perry Co., Pa. - Water Supply. Installation of chlorination apparatus . No cost estimate available.

125. Duncansville, Blair Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

126. Dushore, Sullivan Co., Pa. - Water Supply. Renewal of water mains. No cost estimate available.

127. East Freedom, Blair Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

128. Elimsport, Lycoming Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

129. Factoryville, Wyoming Co., Pa. - Water Supply. Rehabilitation of intake crib and pipe under Lake Sheridan. No cost estimate available.

130. Fort Littleton, Fulton Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

131. Frailey Township, Schuylkill Co., Pa. - Water Supply. Construction of a cement lining for reservoir and miscellaneous improvements. Estimated cost - $1,000.

132. Friedensburg, Schuylkill Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

133. Glenburn, Lackawanna Co., Pa. - Water Supply. Installation of a permanent type of chlorination apparatus. Estimated Cost - $750.

134. Glen Hope, Clearfield Co., Pa. - Water Supply. Construction of a complete new water system. Estimated cost - $2,400.

135. Grampian, Clearfield Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

136. Green Village, Franklin Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

137. Hallstead and Great Bend, Susquehanna Co., Pa. - Water Supply. Construction of a filter plant for DuBois Creek supply. No cost estimate available.

138. Hanover, York Co., Pa. - Water Supply. Construction of additions to filtration plant; construction of new water lines and improvements to water shed. Estimated cost - $243,800.

139. Harford, Susquehanna Co., Pa. - Water Supply. Install chlorinator and protect intake. No cost estimate available.

140. Harrisburg, Dauphin Co., Pa. - Water Supply. Construction of a mixing basin at filter plant. Construction of new water main; local water lines and return pump on Susquehanna Division. Estimated cost - $87,000.

141. Hartletown, Union Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

142. Herndon, Northumberland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

143. Hollidaysburg, Blair Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

144. Hopbottom, Susquehanna Co., Pa. - Water Supply. Improvements to chlorination facilities. No cost estimate available.

145. Howard, Centre Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

146. Hublersburg, Centre Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

147. Hummels Wharf, Snyder Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

148. Huntingdon Co., Pa. - Water Supply. Construction of public water supply systems for the boroughs of Broad Top, Cassville, Coalmont, Dudley, Marklesburg, Mill Creek, Petersburg, Shade Gap and the village of McAlevys Fort. No cost estimate available.

149. Irvona, Clearfield Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

150. Jeddo, Luzerne Co., Pa. - Water Supply. Installation of chlorination apparatus for southeast and southwest Ebervale Reservoirs. No cost estimate available.

151. Karthaus, Clearfield Co., Pa. - Water Supply. Construction of a water supply system. Estimated cost - $30,000.

152. Kistler, Mifflin Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

153. Klingerstown, Schuylkill Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

154. Kratzerville, Snyder Co., Pa. - Water Supply. Construction of reservoir for fire protection. Estimated cost - $1,200.

155. Lake Winola, Wyoming Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

156. Lancaster, Lancaster Co., Pa. - Water Supply. Construction of a water main. Estimated cost - $ 3,500.

157. Lancaster Co., Pa. - Water Supply. Construction of public water supply systems for the boroughs of Adamstown and Washington; and the villages of Bainbridge, Bareville, Brickersville, Churchtown, East Petersburg, Landisville, Maytown, Mechanicsville, Neffsville, Paradise and Reinholds. No cost estimates available.

158. Laurel Run, Luzerne Co., Pa. - Water Supply. Installation of chlorination apparatus for upland supply. No cost estimate available.

159. Laurelton, Union Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

160. Lawrenceville, Tioga Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

161. Lemont, Centre Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

162. Lemoyne, New Cumberland, Camp Hill, Shiremanstown, Wormleysburg, West Fairview and Enola, Pa. - Water Supply. Construction of an improved mixing basin and installation of loss of head gauges. No cost estimate available.

163. LeRaysville, Bradford Co., Pa. - Water Supply. Extension of water mains. Estimated cost - $2,000.

164. Letterkenny Township, Franklin Co., Pa. - Water Supply. Construction of 3 reservoirs for water supply and fire protection. Estimated cost - $4,000.

165. Liberty, Tioga Co., Pa. - Water Supply. Construction of a water supply system. Estimated cost $5,000

166. Lock Haven, Clinton Co., Pa. - Water Supply. Construction of storage reservoir and water lines. Estimated cost - $75,450.

167. Loganville, York Co., Pa. - Water Supply. Construction of a municipal water supply system. Estimated cost - $24,000.

169. Mansfield, Tioga Co., Pa. - Water Supply. Construction of a dam and reservoir. No cost estimate available.

170. Mansfield, Tioga Co., Pa. - College. Water Supply. Construction of a filtration plant. No cost estimate available.

171. Martinsburg, Blair Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

172. Marysville, Perry Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

173. McEwensville, Northumberland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

174. McHenry Township, Lycoming Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $5,000.

175. McVeytown, Mifflin Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

176. Meshoppen, Wyoming Co., Pa. - Water Supply. Construction of a filtration plant or the development of a new source of supply. No cost estimate available.

177. Mifflintown, Juniata Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

178. Mifflinville, Columbia Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

179. Milan, Bradford Co., Pa. - Water Supply. Construction of reservoir for fire protection. Estimated cost - $10,000.

180. Millerstown, Perry Co., Pa. - Water Supply. Extension of water supply system. Estimated cost - $6,000.

181. Millville, Columbia Co., Pa. - Water Supply. Construction of a filter plant. Estimated cost - $15,000.

182. Mocanaqua, Luzerne Co., Pa. - Water Supply. Obtain an increased water supply and protect waterworks intake. No cost estimate available.

183. Montgomery, Lycoming Co., Pa. - Water Supply. Construction of a wash water tank. No cost estimate available.

184. Mt. Joy, Lancaster Co., Pa. - Water Supply. Improvements and additions to present water system. Estimated cost - $16,000.

185. Mt. Union, Huntingdon Co., Pa. - Water Supply. Installation of chlori-

nation apparatus for Dark Hollow Supply. No cost estimate available.

186. New Oxford, Adams Co., Pa. - Water Supply. Reconstruction of plant to provide adequate filtration facilities. Estimated cost $20,000.

187. Newport, Perry Co., Pa. - Water Supply. Construction of a more efficient mixing basin. No cost estimate available.

188. Newry, Blair Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

189. Newton Hamilton, Mifflin Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

190. Nicholson, Wyoming Co., Pa. - Water Supply. Construction of a filtration plant. No cost estimate available.

191. Nippenose Township, Lycoming Co., Pa. - Water Supply. Construction of a reservoir and supply system for fire protection. Estimated cost - $5,000.

192. Nittany, Centre Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

193. North Bend, Clinton Co., Pa. - Water Supply. Extension of waterworks to serve entire community. No cost estimate available.

194. Noxen, Wyoming Co., Pa. - Water Supply. Construction of protection works for main supply reservoir and #3 spring; installation of chlorination apparatus for upland stream supply. No cost estimate available.

195. Oakland, Susquehanna Co., Pa. - Water Supply. Rehabilitate springs and collecting reservoir; improve drilled well pumping equipment. No cost estimate available.

196. Orbisonia, Huntingdon Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

197. Patton, Cambria Co., Pa. - Water Supply. Construction of a more efficient mixing basin. No cost estimate available.

198. Perry Co., Pa. - Water Supply. Construction of public water supply systems for the boroughs of Landisburg, Liverpool, New Buffalo and the villages of Andersonburg and Loysville. No cost estimates available.

199. Picture Rocks, Lycoming Co., Pa. - Water Supply. Construction of an adequate water supply system. No cost estimates available.

200. Port Matilda, Centre Co., Pa. - Water Supply. Obtain auxiliary source of supply. No cost estimate available.

201. Pottsgrove, Northumberland Co., Pa. - Water Supply. Construction of a water supply system. Estimated cost - $5,000.

202. Red Lion, York Co., Pa. - Water Supply. Construction of a more efficient type of mixing basin. No cost estimate available.

203. Rehrersburg, Berks Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

204. Renovo, Clinton Co., Pa. - Water Supply. Completion of water supply system. Estimated cost - $75,000.

205. Ringtown, Schuylkill Co., Pa. - Water Supply. Construction of a new water supply system. Estimated cost - $25,000.

206. Riverside, Northumberland Co., Pa. - Water Supply. Construction of a water supply system. Estimated cost - $50,000.

207. Roaring Springs, Blair Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

208. Rush Township, Centre Co., Pa. - Water Supply. Extension of water

mains to Ghemtown and Ernestville. Estimated cost - $4,000.

209. Sankertown, Cambria Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

210. St John, Luzerne Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

211. Saxton, Bedford Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

212. Selinsgrove, Snyder Co., Pa. - Water Supply. Construction of filter plant. Estimated cost - $30,000.

213. Shamokin Dam, Snyder Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

214. Shavertown, Luzerne Co., Pa. - Water Supply. Provide additional storage facilities. No cost estimate available.

215. Shickshinny, Luzerne Co., Pa. - Water Supply. Construction of a filtration plant. Estimated cost - $60,000.

216. Shrewsbury, York Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

217. Sinnamahoning, Cameron Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

218. Snydertown, Northumberland Co., Pa. Water Supply. Construction of a public water supply system.

219. Sonestown, Sullivan Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

220. South Montrose, Susquehanna Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

221. South Renovo, Clinton Co., Pa. - Water Supply. Relocation of water course to existing reservoir. Estimated cost - $6,000.

222. Spangler, Cambria Co., Pa. - Water Supply. Construction of filter plant for surface supplies. Estimated cost - $30,000.

223. Spring Grove, York Co., Pa. - Water Supply. Construction of a more efficient mixing basin and replacement of loss of head gauges. No cost estimate available.

224. Springville, Susquehanna Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

225. Starrucca, Wayne Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

226. State College, Centre Co., Pa. - Water Supply. Improvements to distribution system, reconstruction of reservoir and additions to supply line. Estimated cost - $82,000.

227. State College, Centre Co., Pa. - Water supply for College. Construction of an elevated storage tank, two deep well pumps, one pressure pump and 7,000 feet of 12" water main. No cost estimate available.

228. Suedberg, Schuylkill Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

229. Sunbury, Northumberland Co., Pa. - Water Supply. Construction of a new sedimentation basin. No cost estimate available.

230. Susquehanna River Drainage Basin.--Water Supply. Study to determine future needs and adequacy of water supplies for municipalities in the Susquehanna Basin. No cost estimate available.

231. Sylvania, Bradford Co., Pa. - Water Supply. Construction of reservoir for fire protection. Estimated cost $700.

232. Trout Run, Lycoming Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

233. Troy, Bradford Co., Pa. - Water Supply. Construction of filter plant, renewal of water mains and service lines. No cost estimate available.

234. Trucksville, Luzerne Co., Pa. - Water Supply. Provide an additional source of supply and install chlorination apparatus for present supply. Estimated cost - $750.

235. Tyler, Clearfield Co., Pa. - Water Supply. Construction of a complete new water system to replace present disintegrated system. No cost estimate available.

236. Uniondale, Susquehanna Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

237. Washingtonville, Montour Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

238. Waterside and Loysburg, Bedford Co., Pa. - Water Supply. Protection of springs used as the source of present supply. No cost estimate available.

239. Waterville, Lycoming Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

240. Weedville, Elk Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

241. Wellsboro, Tioga Co., Pa. - Water Supply. Construction of cement lining for reservoir wells. No cost estimate available.

242. Weigh Scales, Northumberland Co., Pa. - Water Supply. Extension of water mains. Estimated cost - $53,000.

243. <u>White Haven, Luzerne Co., Pa</u>. - Water Supply. Install chlorination apparatus for treatment of upland stream supply and spring fed reservoir in the borough. No cost estimate available.

244. <u>Williamsburg, Blair Co., Pa</u>. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

245. <u>Winfield, Union Co., Pa</u>. - Water Supply. Construction of a public water supply system. No cost estimate available.

246. <u>Worlds End, Sullivan Co., Pa</u>. - Water Supply. Construction of a public water supply system. No cost estimate available.

247. <u>Wrightsville, York Co., Pa</u>. - Water Supply. Construction of a more efficient mixing basin and replacement of loss of head gauge. No cost estimate available.

248. <u>Wyalusing, Bradford Co., Pa</u>. - Water Supply. Construction of a filter plant. No cost estimate available.

249. <u>Wysox, Bradford Co., Pa</u>. - Water Supply. Construction of a public water supply system. No cost estimate available.

250. <u>York Co., Pa.</u> - Water Supply. Construction of public water supply systems for the boroughs of Cross Roads, East Prospect, Fawn Grove, Felton, Franklinstown, Goldsboro, Jacobus, Jefferson, Lewisberry, New Salem, Seven Valleys, Wellsville, Winterstown, Yorkanna, York Haven and the village of Shiloh. No cost estimates available.

251. <u>York Springs, Adams Co., Pa</u>. - Water Supply. Construction of a municipal water supply system. Estimated cost - $28,000.

252. <u>Youngsdale and McElhatten, Clinton Co., Pa</u>. - Water Supply. Construction of a public water supply system. No cost estimate available.

253. Zerbe Township, Northumberland Co., Pa. - Water Supply. Construction of water mains. Estimated cost - $60,000.

POWER

254. Raystown Branch, Huntingdon Co., Pa. - Water Power. Construction of of Raystown Storage and Power Dam. Estimated cost - $21,528,000.

## Potomac Basin

The projects listed are recommended as a part of the comprehensive development of the Potomac Basin in Pennsylvania.

Information concerning these projects was obtained from various sources, including the Pennsylvania Department of Health, Sanitary Waters Board, Pennsylvania Department of Forests and Waters, Drainage Basin Consultants for the National Resources Committee, United States Army Corps of Engineers Reports, National Inventory of Works Projects, and Public Works Administration.

Inasmuch as the time allotted did not permit the reporting agencies to make detailed cost analysis for many of the projects submitted, the information has been treated as advance confidential data. For this reason the name of the reporting agency is not included in the project list.

All information is as of September, 1936.

### GROUP I - IMMEDIATE CONSTRUCTION

Projects which are ready for construction and should be undertaken as soon as possible.

301. Fannettsburg, Franklin Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $18,000.

302. Fairfield, Adams Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $25,000.

303. Iron Springs, Adams Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $25,000.

304. Marion, Franklin Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $25,000.

305. McKnightstown, Adams Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $20,000.

306. Mt. Alto, Franklin Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $34,000.

307. Quincy, Franklin Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $30,000.

308. Scotland, Franklin Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $25,000.

309. Wellersburg, Somerset Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $20,000.

## GROUP II - DEFERRED CONSTRUCTION

Projects which, while desirable for immediate construction, (a) involve controversial questions, (b) can have their priority definitely determined only after additional studies which cannot be completed in time for this report, or (c) are now obstructed by legal administrative or other difficulties.

310. Greencastle, Franklin Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. Estimated cost - $100,000.

311. Hyndman, Bedford Co., Pa. - Pollution Abatement. Construction of additional sanitary sewers and a primary treatment sewage disposal plant. Estimated cost - $25,000.

312. Littlestown, Adams Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. Estimated cost - $100,000.

313. McConnellsburg, Fulton Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. Estimated cost - $100,000.

314. Mercersburg, Franklin Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. Estimated cost - $100,000.

GROUP III - INDETERMINATE CONSTRUCTION

Projects whose specific priority in the program is as yet indeterminate.

315. Centerville, Bedford Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

316. Chambersburg, Franklin Co., Pa. - Pollution Abatement. Extension of sanitary sewers. Estimated cost - $21,000.

317. Dry Run, Franklin Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

318. Gettysburg, Adams Co., Pa. - Water Supply. Installation of a more efficient type of mixing basin and new loss of head guages; reconstruction of one filter unit. No cost estimate available.

319. Glenco, Somerset Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

320. Hyndman, Bedford Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

321. McConnellsburg, Fulton Co., Pa. - Water Supply. Installation of improved chlorinating equipment; erection of housings for chlorine equipment and sources of supply. No cost estimate available.

322. <u>Rouzerville, Franklin Co., Pa</u>. - Water Supply. Installation of a more efficient type of mixing basin. No cost estimate available.

323. <u>New Freedom, York Co., Pa</u>. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

# A P P E N D I C E S

APPENDIX - A

WATER SUPPLY STATISTICS

Water Supply Systems — North Branch Susquehanna Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's and type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities over 100,000 | | | | | | |
| Scranton | Lackawanna | 138,207 | Creek | 250,000 (C)<br>25,000 (F) | | |
| Cities 50,000 to 100,000 | | | | | | |
| Wilkes-Barre | Luzerne | 85,259 | Creek & Lake | 360,500 (C)<br>70,000 (F) | | |
| Cities & Boro's 25,000 to 50,000 | | | | | | |
| Nanticoke | Luzerne | 26,728 | Wilkes-Barre | X (C) | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | |
| Berwick | Columbia | 12,582 | Creek | 15,000 (C) | | |
| Carbondale | Lackawanna | 18,851 | Scranton | X (C) | | |
| Dickson | Lackawanna | 12,089 | Creek | X (1916) (U) | | |
| Dunmore | Lackawanna | 22,951 | Scranton | X (C) | | |
| Old Forge | Lackawanna | 12,378 | Wilkes-Barre | X (C) | | |
| Kingston | Luzerne | 20,708 | " " | X (C) | | |
| Pittston | Luzerne | 19,407 | " " | X (C) | | |
| Plymouth | Luzerne | 16,760 | " " | X (C) | | |

Type of treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
X - Population served not seperated for community.

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 5,000 to 10,000 | | | | | | |
| Sayre | Bradford | 6,975 | River | 14,000 (F) | | |
| Bloomsburg | Columbia | 9,607 | | 10,000 (F) | | |
| Archbald | Lackawanna | 9,650 | Scranton | X (C) | | |
| Blakely | Lackawanna | 8,538 | Scranton | X (C) | | |
| Moosic | Lackawanna | 5,639 | Wilkes-Barre | X (C) | | |
| Olyphant | Lackawanna | 9,860 | Scranton | X (C) | | |
| Taylor | Lackawanna | 9,238 | Scranton | X (C) | | |
| Throop | Lackawanna | 8,240 | Scranton | X (C) | | |
| Winton | Lackawanna | 8,445 | Scranton | X (C) | | |
| Ashley | Luzerne | 6,902 | Wilkes-Barre | X (C) | | |
| Dupont | Luzerne | 5,165 | Wilkes-Barre | X (C) | | |
| Duryea | Luzerne | 8,217 | Wilkes-Barre | X (C) | | |
| Edwardsville | Luzerne | 8,433 | Wilkes-Barre | X (C) | | |
| Exeter | Luzerne | 5,670 | Wilkes-Barre | X (C) | | |
| Forty-Fort | Luzerne | 6,158 | Wilkes-Barre | X (C) | | |
| Larksville | Luzerne | 8,878 | | | | |
| Luzerne | Luzerne | 7,661 | Wilkes-Barre | X (C) | | |
| Swoyersville | Luzerne | 9,272 | Wilkes-Barre | X (C) | | |
| West Hazleton | Luzerne | 7,405 | Hazleton | X (C) | | |
| West Pittston | Luzerne | 7,652 | Wilkes-Barre | X (C) | | |
| Danville | Montour | 7,626 | River | 300 (C)<br>8700 (F) | Mixing Basin and improvements to filter plant | |
| McAdoo | Schuylkill | 5,066 | Creek & Well | 6000 (C) | | |
| Forest City | Susquehanna | 5,045 | Scranton | X (C) | | |

Water Supply Systems

North Branch Susquehanna Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 to 5,000 | | | | | | |
| Athens | Bradford | 4,325 | Creek | X(1916)(U) | | |
| Towanda | Bradford | 4,020 | Creek, Spring, Well | 5000 (C) | | |
| Clarks Green | Lackawanna | 3,597 | Well & Spring | X(1916)(U) | | |
| Clarks Summit | Lackawanna | | | | | |
| Jermyn | Lackawanna | 3,591 | Scranton | X (C) | | |
| Mayfield | Lackawanna | 3,628 | Scranton | X (C) | | |
| Avoca | Luzerne | 4,697 | Scranton | X (C) | | |
| Hughestown | Luzerne | 2,609 | Wilkes-Barre | X (C) | | |
| Sugar Notch | Luzerne | 2,843 | | | | |
| West Wyoming | Luzerne | 2,825 | Wilkes-Barre | X (C) | | |
| Wyoming | Luzerne | 4,627 | Wilkes-Barre | X (C) | | |
| Susquehanna Depot | Susquehanna | 2,752 | Creek | 4000 (F) | | |
| Borough's 2,500 and Less | | | | | | |
| Alba | Bradford | 145 | | | | |
| Burlington | Bradford | 28 | | | | |
| Canton | Bradford | 1,960 | Creek & Lake | 2000 (C) | | |
| Le Raysville | Bradford | 320 | Well | 300 (C) | | |
| Monroe | Bradford | 771 | | | | |
| New Albany | Bradford | 492 | Spring | X(1916)(U) | | |
| Rome | Bradford | 235 | | | | |
| South Waverly | Bradford | 1,350 | Creek | X(1916)(U) | | |
| Sylvania | Bradford | 184 | | | | |
| Troy | Bradford | 1,318 | Creek | 1200 (C) | Filter Plant | Permit Issued |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Wyalusing | Bradford | 827 | Creek | 700 (C) | Filter Plant | Permit Issued |
| Benton | Columbia | 802 | Spring | X(1916)(U) | | |
| Briar Creek | Columbia | 230 | | | | |
| Catawissa | Columbia | 2,118 | Spring | X (U) | Impr. to spring | Decrees Issued |
| Centralia | Columbia | 2,493 | Creek | 2500 (C) | | |
| Millville | Columbia | 879 | Creek & Well | 650 (C) | Filter Plant | |
| Orangeville | Columbia | 428 | | | | |
| Stillwater | Columbia | 159 | | | | |
| Dalton | Lackawanna | 1,084 | Well | 1200 (C) | Impr. to reservoir | |
| Elmhurst | Lackawanna | 787 | | | | |
| Gouldsboro | Lackawanna | 106 | | | | |
| Moscow | Lackawanna | 1,087 | Spring & Creek | 900 (C) | | |
| Vandling | Lackawanna | 1,108 | | | | |
| Conyngham | Luzerne | 976 | Well | X(1916)(U) | | |
| Courtdale | Luzerne | 1,254 | Wilkes-Barre | X (C) | | |
| Dallas | Luzerne | 1,782 | Spring | X (U) | Additional storage | |
| Jeddo | Luzerne | 385 | | X (U) | Chlorination plant | |
| Laflin | Luzerne | 442 | Wilkes-Barre | X (C) | | |
| Laurel Run | Luzerne | 1,095 | Creek | X(1916)(U) | Chlorination | |
| Nescopeck | Luzerne | 1,779 | Berwick | X (C) | | |
| New Columbus | Luzerne | 178 | | | | |
| Pringle | Luzerne | 2,262 | | | | |
| Shickshinny | Luzerne | 2,323 | Creek | 3500 (C) | Filter Plant | Order Issued |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Warrior Run | Luzerne | 1,407 | | | | |
| White Haven | Luzerne | 1,677 | Wilkes-Barre | X (C) | Chlorination Plant | |
| Riverside | Northumberland | 526 | | | Public Supply | |
| Ringtown | Schuylkill | 945 | Well | X(1916)(U) | | |
| Friendsville | Susquehanna | 74 | | | | |
| Great Bend | Susquehanna | 622 | Hallstead | X (C) | Filter Plant | Order Issued |
| Hallstead | Susquehanna | 1,188 | Lake & Creek | 1900 (C) | Filter Plant | |
| Hopbottom | Susquehanna | 508 | Spring | 350 (C) | Impr. Chlorination | Order Issued |
| Lanesboro | Susquehanna | 647 | Susquehanna | X (F) | | |
| Little Meadows | Susquehanna | 132 | | | | |
| Montrose | Susquehanna | 1,769 | Lake | 2000 (C) | | |
| New Milford | Susquehanna | 1,230 | Spring & Creek | 800 (C) | | |
| Oakland | Susquehanna | 991 | Spring | X(1916)(U) | Improvements | |
| Thompson | Susquehanna | 342 | Spring | X(1916)(U) | | |
| Uniondale | Susquehanna | 377 | | | Public Supply | |
| Knoxville | Tioga | 631 | Spring | | Public Supply | |
| Lawrenceville | Tioga | 556 | | | Public Supply | |
| Mansfield | Tioga | 1,867 | Creek | 2300 (C) | Reservoir and Filter Plant | Mansfield College |
| Roseville | Tioga | 95 | | | | |
| Tioga | Tioga | 455 | Creek | 430 (C) | | |
| Westfield | Tioga | 1,227 | Spring | X(1916)(U) | | |
| Starrucca | Wayne | 358 | | | Public Supply | |
| Factoryville | Wyoming | 816 | Lake | 900 (C) | Intake Crib and Improvements | |
| Laceyville | Wyoming | 437 | Spring | X(1916)(U) | | |

Water Supply Systems North Branch Susquehanna Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Meshoppen | Wyoming | 541 | Creek | 600 (C) | | |
| Nicholson | Wyoming | 1,000 | Creek | 1,000 (C) | Filter Plant & New Supply | Permit Issued |
| Tunkhannock | Wyoming | 2,262 | Creek and Well | 2,000 (C) | Filter Plant | Permit Issued |
| UNINCORPORATED TOWNS & VILLAGES | | | | | | |
| Monroeton | Bradford | 500 | Towanda | X (C) | | |
| Beaver Valley | Columbia | 512 | | | | |
| Creasy | Columbia | 613 | | | | |
| Espy | Columbia | 700 | | | | |
| Midvalley | Columbia | 900 | | | | |
| Wilburton | Columbia | 550 | | | | |
| Chinchilla | Lackawanna | 600 | | | Public supply | |
| Eynon | Lackawanna | 2,540 | | | | |
| Glenburn | Lackawanna | 520 | | X (U) | Chlorination plant | |
| Jessup | Lackawanna | 6,000 | Creek | X (1916) (U) | | |
| Pyne Breaker | Lackawanna | 500 | | | | |
| Racket Brook | Lackawanna | 500 | | | | |
| Rendham | Lackawanna | 538 | | | | |
| Waverly | Lackawanna | 520 | | | | |
| Alden | Luzerne | 1,800 | | | | |
| Alderson | Luzerne | 600 | | | | |
| Askam | Luzerne | 2,500 | | | | |
| Avondale | Luzerne | 1,042 | | | | |
| Boulevard Manor | Luzerne | | Creek | 150 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| UNINCORPORATED TOWNS & VILLAGES | | | | | | |
| Breslau | Luzerne | 972 | | | | |
| Brookside | Luzerne | 2,000 | | | | |
| Buttonwood | Luzerne | 900 | | | | |
| Carverton | Luzerne | 500 | | | | |
| Chauncey | Luzerne | 655 | | | | |
| Coalridge | Luzerne | 1,000 | | | | |
| Ebervale | Luzerne | 580 | | | | |
| Empire | Luzerne | 1,200 | | | | |
| Fern Glen | Luzerne | 800 | Creek | X (1916) (U) | | |
| Georgetown | Luzerne | 2,000 | | | | |
| Glenlyon | Luzerne | 5,293 | | | | |
| Gum Run | Luzerne | 500 | | | | |
| Harleigh | Luzerne | 585 | | | | |
| Harwood Mine | Luzerne | 960 | Well | X (1916) (U) | | |
| Hemlock Creek | Luzerne | 525 | | | | |
| Hudson | Luzerne | 2,050 | Wilkes-Barre | X (C) | | |
| Inkerman | Luzerne | 527 | Wilkes-Barre | X (C) | | |
| Lattimer | Luzerne | 1,355 | | | | |
| Lee Park | Luzerne | 2,000 | | | | |
| Midvale | Luzerne | 500 | | | | |
| Miners Mills | Luzerne | 3,000 | Wilkes-Barre | X (C) | | |
| Mocanaqua | Luzerne | 2,800 | Well | X (1916) (U) | Auxiliary Supply | |
| Mountaintop | Luzerne | 1,150 | | | | |
| Newtown | Luzerne | 3,000 | | | | |
| Olivers Mills | Luzerne | 500 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| UNINCORPORATED TOWNS & VILLAGES | | | | | | |
| Parsons | Luzerne | 5,625 | Wilkes-Barre | X (C) | | |
| Retreat | Luzerne | 2,000 | Well | 1200 (C) | | |
| Rhone | Luzerne | 1,692 | | | | |
| Sturmerville | Luzerne | 5,725 | | | | |
| Tomhicken | Luzerne | 500 | | | | |
| Wanamie | Luzerne | 1,536 | | | | |
| West Nanticoke | Luzerne | 1,811 | Wilkes-Barre | X (C) | | |
| Yatesville | Luzerne | 765 | Wilkes-Barre | X (C) | | |
| Elysburg | Northumberland | 625 | | | | |
| Ranshaw | Northumberland | 2,000 | | | | |
| Kelayres | Schuylkill | 1,527 | | | | |
| Nuremberg | Schuylkill | 1,020 | Well | X (1916) (U) | | |
| Oneida | Schuylkill | 1,068 | Well | X (1916) (U) | | |
| Park Place | Schuylkill | 1,219 | Creek | X (1916) (U) | | |
| Zion Grove | Schuylkill | 600 | | | | |
| Covington | Tioga | 500 | | | | |
| Morris Run | Tioga | 2,352 | | | | |
| Osceola | Tioga | 568 | Creek | X (1916) (U) | | |
| Noxen | Wyoming | 1,100 | Spring | X (1916) (U) | Chlorination plant | |

Water Supply Systems West Branch Susquehanna Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | | | | |
| None | | | | | | |
| Cities 25,000 to 50,000 | | | | | | |
| Williamsport | Lycoming | 44,018 | Creek | 55,000 (C) | | |
| Cities and Boro's 10,000 to 25,000 | | | | | | |
| Lock Haven | Clinton | 10,406 | Creek | 10,000 (C) | Reservoir | |
| Boro's 5,000 to 10,000 | | | | | | |
| Bellefonte | Centre | 5,339 | Spring | X (1916)(U) | | |
| State College | Centre | 5,494 | Creek & Well | 10,000 (C) | Tank, pumps and main | |
| Clearfield | Clearfield | 9,573 | Creek | 4,500 (C) | | |
| St. Marys | Elk | 7,737 | Creek | 7,500 (C) | | |
| Jersey Shore | Lycoming | 5,424 | Creek | (6200)(C)(6500)(F) | | 2 supplies |
| South Williamsport | Lycoming | 5,948 | Williamsport | X (C) | | |
| Milton | Northumberland | 8,650 | Creek | 12,000 (C) | | |

Type of treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
X - Population served not separated for community.

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 2,500 to 5,000 | | | | | | |
| Barnesboro | Cambria | 3,971 | Well | X (1916) (U) | | |
| Gallitzin | Cambria | 3,847 | Creek | 3,600 (C) | | |
| Patton | Cambria | 3,154 | Creek | 3,000 (F) | Mixing Basin | |
| Spangler | Cambria | 2,734 | Creek | 3,200 (C) | Filter Plant | |
| Emporium | Cameron | 3,057 | Creek | 3,000 (C) | | |
| Phillipsburg | Centre | 4,088 | Creek | 5,000 (C) | | |
| Curwensville | Clearfield | 3,194 | Creek | X (1916) (U) | Chlorinator | Permit Issued |
| Renova | Clinton | 3,930 | Creek | 5,600 (C) | | 2 Plants |
| Montoursville | Lycoming | 3,093 | Well | 2,800 (C) | | |
| Muncy | Lycoming | 4,268 | Creek | 2,500 (C) | | |
| | | | | (2,200)(F) | | 2 Supplies |
| Northumberland | Northumberland | 4,330 | Creek, Well | 5,200 (C) | | 2 Plants |
| Wellsboro | Tioga | 3,774 | Creek, Spring | 3,700 (C) | Improved Reservoir | |
| Lewisburg | Union | 3,878 | Creek | 4,500 (C) | | |
| Boro's 2,500 and Less | | | | | | |
| Ashville | Cambria | 627 | | | Public Supply | |
| Carrolltown | Cambria | 1,367 | Spring & Well | X (1916) (U) | Chlorinator | Order Issued |
| Chest Springs | Cambria | 161 | | | Public Supply | |
| Hastings | Cambria | 2,219 | Spring | X (1916) (U) | | |
| Loretto | Cambria | 445 | | | | |
| Sankertown | Cambria | 953 | | X (U) | Chlorination & Impr. | Order Issued |
| Driftwood | Cameron | 308 | Creek | 300 (C) | | |
| Centre Hall | Centre | 675 | Spring | X (1916) (U) | | |
| Howard | Centre | 705 | Creek | X (1916) (U) | Chlorination | Permit 2/7/35 |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | |
| Milesburg | Centre | 679 | Creek | 700 (C) | | |
| Port Matilda | Centre | 589 | Spring | (X) (1916)(U) | Auxilliary Supply | |
| Snow Shoe | Centre | 672 | Creek & Spring | 550 (C) | | |
| South Phillipsburg | Centre | 507 | Phillipsburg | X (C) | | |
| Unionville | Centre | 310 | Spring | (X) (1916) (U) | | |
| Brisbin | Clearfield | 488 | | | | |
| Burnside | Clearfield | 424 | | | | |
| Chester Hill | Clearfield | 956 | Phillipsburg | X (C) | | |
| Coalport | Clearfield | 1,206 | Well | 1,400 (F) | | |
| Glen Hope | Clearfield | 158 | | | | |
| Grampian | Clearfield | 654 | | | Public Supply | |
| Houtzdale | Clearfield | 1,456 | Creek | 1,500 (C) | | |
| Irvona | Clearfield | 1,042 | | | Public Supply | |
| Lumber City | Clearfield | 309 | Spring & River | 250 (F) | | |
| Mahaffey | Clearfield | 622 | Spring | X (1916) (U) | | |
| Newburg | Clearfield | 151 | | | | |
| Osceola Mills | Clearfield | 2,032 | Creek | 2,200 (C) | | |
| Ramey | Clearfield | 813 | Creek | 2,500 (C) | | |
| Wallaceton | Clearfield | 386 | | | | |
| Westover | Clearfield | 689 | | | | |
| Avis | Clinton | 1,132 | Creek | 2,000 (C) | | |
| Beech Creek | Clinton | 689 | | | Public Supply | Under Construction P. W. A. |
| Flemington | Clinton | 1,184 | Creek | X (1916) (U) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | |
| Logantown | Clinton | 352 | Spring | X (1916) (U) | | |
| Mill Hall | Clinton | 677 | Creek, Well | 3,000 (C) | | |
| South Renovo | Clinton | 1,076 | Creek | 1,100 (C) | | |
| Cherrytree | Indiana | 524 | Creek | 550 (C) | | |
| Glen Campbell | Indiana | 628 | Creek | X (1916) (U) | | |
| Duboistown | Lycoming | 1,059 | Williamsport | X (C) | | |
| Hughesville | Lycoming | 1,892 | Well | 2,000 (C) | | |
| Montgomery | Lycoming | 2,164 | Creek | 1,800 (F) | Wash Water Tank | |
| Picture Rocks | Lycoming | 519 | Spring | X (1916) (U) | | |
| Salladasburg | Lycoming | 247 | Jersey Shore | X (F) | | |
| Washingtonville | Montour | 232 | | | Public Supply | |
| McEwensville | Northumberland | 226 | | | Public Supply | |
| Turbotville | Northumberland | 491 | | | | |
| Watsontown | Northumberland | 2,304 | Milton | X (C) | | |
| Austin | Potter | 1,135 | Spring & Well | 1,200 (C) | | |
| Galeton | Potter | 1,928 | Creek | X (1916) (U) | | |
| Dushore | Sullivan | 832 | Creek | 800 (C) | Water Mains | |
| Eagles Mere | Sullivan | 266 | Lake | 3,000 (F) | | |
| Forksville | Sullivan | 150 | | | | |
| Laporte | Sullivan | 246 | Spring | X (1916) (U) | | |
| Blossburg | Tioga | 1,637 | Creek | 1,700 (C) | Chlorinator | |
| Liberty | Tioga | 255 | | | | |
| Mifflinburg | Union | 2,194 | Creek | 2,000 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Unincorporated Towns and Villages | | | | | | |
| Bakerton | Cambria | 1,200 | Creek | 1,000 (C) | | |
| Blandburg | Cambria | 1,821 | Creek | X (1916) (U) | | |
| Emeigh | Cambria | 1,750 | | | | |
| Marsteller | Cambria | 1,100 | | | | |
| Saint Benedict | Cambria | 600 | Creek | X (1916) (U) | | |
| Sinnemahoning | Cameron | 500 | | | Public Supply | |
| Blanchard | Centre | 531 | | | | |
| Clarence | Centre | 800 | Spring | 100 (C) | | |
| Miles | Centre | 600 | | | | |
| Orviston | Centre | 528 | Creek | 450 (C) | | |
| Pleasant Gap | Centre | 900 | Creek | 500 (C) | | |
| Beulah | Clearfield | 500 | | | | |
| Blue Ball | Clearfield | 900 | Spring | 200 (C) | | |
| Grassflat | Clearfield | 1,200 | | | | |
| Hawk Run | Clearfield | 663 | | | | |
| Karthaus | Clearfield | 550 | | | Public Supply | |
| Kylertown | Clearfield | 500 | | | | |
| Madera | Clearfield | 1,136 | Spring | X (1916) (U) | | |
| Morann | Clearfield | 1,047 | | | | |
| Morrisdale | Clearfield | 1,100 | Creek | X (1916) (U) | | |
| Munson | Clearfield | 650 | Winburne | X (C) | | |
| Penfield | Clearfield | 816 | Creek | X (1916) (U) | | |
| Rose Bud | Clearfield | 1,000 | | | | |
| Smithmill | Clearfield | 618 | | | | |
| Smokerun | Clearfield | 592 | Houtzdale | X (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Unincorporated Towns and Villages | | | | | | |
| Tyler | Clearfield | 2,036 | Spring | X (1916) (U) | New System | |
| Wighton (Chester Hill) | Clearfield | 786 | Philipsburg | X (C) | | |
| Williams Grove | Clearfield | 600 | Houtzdale | X (C) | | |
| Winburne | Clearfield | 1,285 | Creek | 3,000 (C) | | |
| Woodland | Clearfield | 1,000 | | | | |
| Gleasonton | Clinton | 500 | | | | |
| North Bend | Clinton | 816 | | | Extensions | |
| Byrnedale | Elk | 619 | | | Public Supply | |
| Force | Elk | 1,100 | | | | |
| Billman | Lycoming | 3,000 | | | | |
| Ralston | Lycoming | 1,000 | Spring & Well | 300 (C) | | |
| Warrensville | Lycoming | 715 | | | | |
| Bernice | Sullivan | 618 | | | | |
| Lopez | Sullivan | 800 | | | | |
| Mildred | Sullivan | 728 | | | | |
| Arnot | Tioga | 648 | Creek | X (1916) (U) | New System | |
| Hoytville | Tioga | 572 | | | | |
| West Milton | Union | 775 | Lewisburg | X (C) | | |

Water Supply Systems Juniata Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served. by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | | | | |
| Altoona | Blair | 79,843 | Creek | 85,000 (C) | | |
| Cities and Boro's 25,000 to 50,000 | | | | | | |
| None | | | | | | |
| Cities and Boro's 10,000 to 25,000 | | | | | | |
| Lewistown | Mifflin | 19,294 | Creek | 22,000 (C) | | |
| Borough's 5,000 to 10,000 | | | | | | |
| Hollidaysburg | Blair | 5,927 | Creek | X (1916)(U) | Chlorination Plant | Order Issued |
| Tyrone | Blair | 9,075 | Creek | 9,100 (C) | | |
| Huntingdon | Huntingdon | 7,485 | River | 8,500 (F) | | |
| Mount Union | Huntingdon | 5,107 | Creek | 4,700 (C) | Chlorination of Dark Hollow Supply | Dark Hollow Dam Under Construction W. P. A. |

Type of treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
X - Population served not seperated for community

Water Supply Systems　　　　Juniata Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 to 5,000 | | | | | | |
| Bedford | Bedford | 3,272 | Spring | X (1916) (U) | Chlorination Plant | Order Issued |
| Bellwood | Blair | 2,674 | Creek | 2,600 (C) | | |
| Roaring Spring | Huntingdon | 2,957 | Creek | X (1916) (U) | Chlorination Plant | Order Issued |
| Burnham | Mifflin | 3,227 | Lewistown | X (C) | | |
| Borough's 2,500 or Less | | | | | | |
| Coaldale | Bedford | 269 | | | Public Supply | |
| Everett | Bedford | 1,991 | Spring | X (1916) (U) | | |
| Hopewell | Bedford | 427 | | | Public Supply | |
| Manns Choice | Bedford | 280 | | | Public Supply | |
| New Paris | Bedford | 194 | | | Public Supply | |
| Pleasantville | Bedford | 204 | | | Public Supply | |
| Rainsburg | Bedford | 259 | Creek | X (1916) (U) | | |
| Saxton | Bedford | 1,201 | Creek | X (1916) (U) | | Order Issued |
| Schellsburg | Bedford | 323 | | | | |
| Saint Clairsville | Bedford | 108 | | | Public Supply | |
| Woodbury | Bedford | 1,097 | | | Public Supply | |
| Duncansville | Blair | 1,281 | Creek | X (1916) (U) | Chlorination Plant | |
| Martinsburg | Blair | 1,409 | Creek | X (1916) (U) | Chlorination Plant | Order Issued |
| Newry | Blair | 635 | | | Public Supply | |
| Williamsburg | Blair | 2,386 | River | X (1916) (U) | Chlorination Plant | Order Issued |
| Tunnel Hill | Cambria | 676 | | | | |
| Alexandria | Huntingdon | 457 | Creek | X (1916) (U) | Chlorination Plant | |
| Birmingham | Huntingdon | 217 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 or Less | | | | | | |
| Broad Top City | Huntingdon | 541 | | | Public Supply | |
| Cassville | Huntingdon | 122 | | | Public Supply | |
| Coalmont | Huntingdon | 169 | | | Public Supply | |
| Dudley | Huntingdon | 418 | | | Public Supply | |
| Mapleton | Huntingdon | 840 | Spring | 500 (C) | | |
| Marklesburg | Huntingdon | 299 | | | Public Supply | |
| Mill Creek | Huntingdon | 364 | | | Public Supply | |
| Orbisonia | Huntingdon | 897 | | X (1935)(U) | Chlorination Plant | |
| Petersburg | Huntingdon | 687 | | | Public Supply | |
| Rockhill | Huntingdon | 609 | | | | |
| Saltillo | Huntingdon | 445 | Spring | X (1916)(U) | | |
| Shade Gap | Huntingdon | 94 | | | Public Supply | |
| Shirleysburg | Huntingdon | 241 | | | Public Supply | |
| Three Springs | Huntingdon | 428 | Spring | X (1916)(U) | | |
| Mifflin | Juniata | 1,064 | Creek | X (1916)(U) | | |
| Mifflintown | Juniata | 1,090 | Creek | X (1916)(U) | Chlorination Plant | |
| Port Royal | Juniata | 830 | Creek & Spring | 600(C) | | |
| Thompsontown | Juniata | 482 | Creek & Spring | 300(C) | | |
| Kistler | Mifflin | 513 | | | Public Supply | |
| McVeytown | Mifflin | 481 | | | Public Supply | |
| Newton Hamilton | " | 392 | | | Public Supply | |
| Millerstown | Perry | 728 | Spring | X (1916)(U) | | |
| Newport | Perry | 1,891 | Creek & River | 1,900(C)<br>1,900(F) | Mixing Basin | |
| New Baltimore | Somerset | 155 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| UNINCORPORATED TOWNS AND VILLAGES | | | | | | |
| Earlston | Bedford | 1,000 | | | | |
| Riddlesburg | Bedford | 610 | River | 600 (F) | | |
| Claysburg | Blair | 1,400 | Spring | 700 (C) | | |
| Greenfield | Blair | 1,400 | | | | |
| Greenwood | Blair | | | | Public Supply | |
| Lakemont | Blair | 1,256 | Creek | X (1916)(U) | | |
| South Altoona | Blair | 940 | Creek | X (1916)(U) | | |
| South Lakemont | Blair | 1,832 | Creek | X (1916)(U) | | |
| Coupon | Cambria | 500 | | | | |
| Robertsdale | Huntingdon | 651 | Creek | 1,000(C) | | |
| South Huntingdon | " | 850 | | | | |
| Woodvale | Huntingdon | 1,500 | Robertsdale | (1916) X (C) | | |
| Bellville | Mifflin | 1,156 | | X (U) | | |
| Milroy | Mifflin | 1,600 | Lewistown | X (C) | | |
| Yeagertown | Mifflin | 1,900 | Lewistown | X (C) | | |
| UNINCORPORATED TOWNSHIPS | | | | | | |
| Logan | Blair | 8,312 | Creek & Spring | 300(C) | | |
| Smithfield | Huntingdon | 2,817 | Spring | 1,300(C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | | | | |
| Harrisburg | Dauphin | 79,620 | River | 85,600 (F) | Mixing Basin | |
| Lancaster | Lancaster | 59,982 | Creek | 67,000 (F) | | |
| York | York | 62,508 | Creek & Spring | 68,000 (F) | | |
| Cities and Boro's 25,000 to 50,000 | | | | | | |
| Lebanon | Lebanon | 25,690 | Creek | 25,550 (C) | Filter Plant for Hamer Creek Supply | |
| Cities and Boro's 10,000 to 25,000 | | | | | | |
| Carlisle | Cumberland | 13,153 | Creek | 12,000 (F) | Improvement to Filter Plant | |
| Steelton | Dauphin | 13,493 | River | 13,400 (F) | | |
| Columbia | Lancaster | 12,026 | River | 11,500 (F) | | |
| Mount Carmel | Northumberland | 18,238 | Spring | 18,000 (C) | | |
| Shamokin | Northumberland | 20,257 | Creek | 25,000 (C) | | |
| Sunbury | Northumberland | 15,582 | River & Creek | 15,900 (F) | Sediment Basin | Order Issued |
| Mahanoy City | Schuylkill | 13,905 | Creek | 19,000 (C) | | |
| Shenandoah | Schuylkill | 21,057 | Creek | 28,000 (C) | | |
| Hanover | York | 11,716 | Creek | 15,000 (F) | Mixing Basin | Order Issued |

Type of treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
X - Population served not seperated for community.

Water Supply Systems — Lower Susquehanna Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 5,000 to 10,000 | | | | | | |
| Mechanicsburg | Cumberland | 6,542 | Creek | 5,000 (F) | | |
| New Cumberland | Cumberland | 4,806 | Creek & Spring | 2,000(C) 20,000 (F) | Impr. to Mixing Basin | |
| Middletown | Dauphin | 6,601 | Well | 4,000 (F) | | |
| Ephrata | Lancaster | 6,190 | Creek, Well & Spring | 5,000 (F) | | |
| Kulpmont | Northumberland | 6,339 | Creek | X (1916)(U) | | |
| Ashland | Schuylkill | 7,040 | Creek, Well & Spring | 7,700 (C) | | |
| Frackville | Schuylkill | 8,545 | Spring & Well | 8,000 (C) | | |
| Girardville | Schuylkill | 5,181 | Creek | 12,000 (C) | | |
| West York | York | 5,355 | York | X (F) | | |
| Borough's 2,500 to 5,000 | | | | | | |
| Abbottstown | Adams | 4,045 | | | | |
| Camp Hill | Cumberland | 3,642 | New Cumberland | X (F) | | |
| Lemoyne | Cumberland | 4,241 | New Cumberland | X (F) | Mixing Basin | |
| Shippensburg | Cumberland | 4,670 | Creek | 4,300 (C) | | |
| Highspire | Dauphin | 2,563 | Spring & Well | 2,400 (C) | | |
| Hummelstown | Dauphin | 2,997 | Creek | 10,000 (F) | | |
| Lykens | Dauphin | 3,474 | Creek | 6,000 (C) | | |
| Millersburg | Dauphin | 3,160 | Well & Spring | 2,900 (C) | | |
| Penbrook | Dauphin | 3,451 | Hummelstown | X (F) | | |
| Williamstown | Dauphin | 3,194 | Creek | 3,000 (C) | | |
| Elizabethtown | Lancaster | 4,005 | Well, Spring & Creek | 4,600 (C) | | |
| Lititz | Lancaster | 4,533 | Well | 4,350 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 to 5,000 | | | | | | |
| Manheim | Lancaster | 3,821 | Creek | 3,500 (F) | | |
| Mount Joy | Lancaster | 2,954 | Creek | 2,300 (F) | | |
| Palmyra | Lebanon | 4,809 | Spring & Well | 4,400 (C) | | |
| Gilberton | Schuylkill | 3,956 | Creek | X (1916) (U) | | |
| Tower City | Schuylkill | 2,842 | Spring & Creek | 2,500 (C) | | |
| Selinsgrove | Snyder | 2,802 | Creek | 2,800 (C) | Filter Plant | |
| Dallastown | York | 2,760 | Creek | X (1916) (U) | | |
| Red Lion | York | 4,827 | | 8,200 (F) | Mixing Basin | |
| Borough's 2,500 and Less | | | | | | |
| Arendtsville | Adams | 491 | Spring | X (1916) (U) | Chlorination Plant | Order Issued |
| Bendersville | Adams | 385 | Spring | X (1916) (U) | | |
| Biglerville | Adams | 539 | Well & Spring | 600 (C) | Auxiliary Supply | |
| East Berlin | Adams | 783 | | | | |
| McSherrystown | Adams | 2,099 | Spring | X (1916) (U) | | |
| New Oxford | Adams | 1,144 | Creek | 1,100 (F) | Filter Plant Impr. | Order Issued |
| York Springs | Adams | 362 | | | Public Supply | |
| Millheim | Centre | 602 | Creek | 680 (C) | | |
| Atglen | Chester | 554 | Spring | X (1916) (U) | | |
| Mount Holly Springs | Cumberland | 1,183 | Creek | 1,140 (C) | | |
| Newburg | Cumberland | 271 | | | Public Supply | |
| Newville | Cumberland | 1,719 | Spring | 1,500 (C) | | |
| Shiremanstown | Cumberland | 710 | New Cumberland | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| West Fairview | Cumberland | 1,965 | New Cumberland | X (F) | | |
| Wormleysburg | Cumberland | 1,662 | New Cumberland | X (F) | | |
| Berrysburg | Dauphin | 413 | | | | |
| Dauphin | Dauphin | 613 | Creek | 1,500 (F) | | |
| Elizabethville | Dauphin | 1,402 | Spring | X (1916) (U) | | |
| Gratz | Dauphin | 668 | | | | |
| Halifax | Dauphin | 855 | Spring & Well | 800 (C) | | |
| Paxtang | Dauphin | 1,540 | Hummelstown | X (F) | | |
| Royalton | Dauphin | 1,412 | Middletown | X (F) | | |
| Uniontown | Dauphin | 518 | Spring | X (1916) (U) | | |
| Orrstown | Franklin | 193 | | | | |
| Adamstown | Lancaster | 928 | | | Public Supply | |
| Akron | Lancaster | 1,203 | Well & Spring | X (1916) (U) | | |
| Christiana | Lancaster | 1,050 | Well & Spring | 1,000 (C) | | |
| Denver | Lancaster | 1,581 | | X (1916) (U) | | |
| Mariette | Lancaster | 2,054 | Creek | 2,000 (C) | | |
| Millersville | Lancaster | 1,970 | Spring | 800 (C) | | |
| Mountville | Lancaster | 982 | Spring | 950 (C) | | |
| New Holland | Lancaster | 1,682 | Well & Spring | 1,225 (C) | | |
| Quarryville | Lancaster | 1,047 | Spring | 1,100 (C) | | |
| Strasburg | Lancaster | 972 | Spring | X (1916) (U) | | |
| Terre Hill | Lancaster | 910 | | | | |
| Washington Boro | Lancaster | 473 | | | Public Supply | |
| Cornwall | Lebanon | 1,816 | Creek | 1,850 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Cleona | Lebanon | 1,262 | Spring | X (1916) (U) | | |
| Jonestown | Lebanon | 636 | Creek | 12,600 (F) | | |
| Lebanon Ind. | Lebanon | 2,125 | | X (1916) (U) | | |
| Mount Gretna | Lebanon | 22 | Well & Spring | 2,000 (C) | | |
| Herndon | Northumberland | 736 | | | Public Supply | |
| Marion Heights | Northumberland | 2,028 | Creek | X (1916) (U) | | |
| Snydertown | Northumberland | 302 | | | Public Supply | |
| Blain | Perry | 288 | Spring | X (1916) (U) | | |
| Bloomfield | Perry | 891 | Spring | 730 (C) | | |
| Duncannon | Perry | 1,706 | | | Chlorination Plant | Order Issued |
| Landisburg | Perry | 253 | | | Public Supply | |
| Liverpool | Perry | 576 | | | Public Supply | |
| Marysville | Perry | 1,884 | | | Chlorination Plant | |
| New Buffalo | Perry | 119 | | | Public Supply | |
| Gordon | Schuylkill | 1,092 | Spring | X (1916) (U) | | |
| Pine Grove | Schuylkill | 2,268 | Creek | X (1916) (U) | | |
| Tremont | Schuylkill | 2,315 | Creek | X (1916) (U) | | |
| Beavertown | Snyder | 931 | | | Chlorination Plant | Order Issued |
| Middleburg | Snyder | 1,061 | Creek | 1,000 (C) | | |
| Shamokin Dam | Snyder | 766 | | | Public Supply | |
| Hartleton | Union | 189 | | | Public Supply | |
| New Berlin | Union | 574 | Spring | X (1916) (U) | | |
| Cross Roads | York | 159 | | | Public Supply | |
| Delta | York | 796 | | | Chlorination Plant | Order Issued |
| Dillsburg | York | 1,122 | Spring | X (1916) (U) | | |

Water Supply Systems

Lower Susquehanna Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Dover | York | 817 | Well | X (1916) (U) | | |
| East Prospect | York | 394 | | | Public Supply | |
| Fawn Grove | York | 313 | | | Public Supply | |
| Felton | York | 416 | | | Public Supply | |
| Franklintown | York | 306 | | | Public Supply | |
| Glen Rock | York | 1,338 | Creek & Spring | X (1916) (U) | | |
| Goldsboro | York | 485 | | | Public Supply | |
| Hallam | York | 653 | Creek & Well | 1,800 (C) | | |
| Jacobus | York | 615 | | | Public Supply | |
| Jefferson | York | 501 | | | Public Supply | |
| Lewisberry | York | 267 | | | Public Supply | |
| Loganville | York | 334 | | | Public Supply | |
| Manchester | York | 1,112 | York | X (F) | | |
| Mount Wolfe | York | 957 | | | | |
| New Freedom | York | 1,307 | | | Chlorination Plant | Order Issued |
| New Salem | York | 362 | | | Public Supply | |
| North York | York | 2,376 | York | X (F) | | |
| Railroad | York | 268 | Spring | X (1916) (U) | | |
| Seven Valleys | York | 382 | | | Public Supply | |
| Shrewsbury | York | 865 | | | Chlorination Plant | Order Issued |
| Spring Grove | York | 1,297 | Creek | 1,200 (F) | Improvement to Mixing Basin | |
| Stewartstown | York | 966 | | | | |
| Wellsville | York | 335 | | | Public Supply | |
| Windsor | York | 1,094 | Spring | 1,000 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Winterstown | York | 229 | | | Public Supply | |
| Wrightsville | York | 2,153 | Creek | 2,200 (F) | Improvement to Mixing Basin | |
| Yoe | York | 598 | Spring | X (1916) (U) | | |
| Yorkana | York | 316 | | | Public Supply | |
| York Haven | York | 948 | | | Public Supply | |
| Unincorporated Towns and Villages | | | | | | |
| Boiling Springs | Cumberland | 1,000 | Well | 900 (C) | | |
| Enola | Cumberland | 2,600 | Well | | | |
| Derry Church | Dauphin | 1,000 | Hershey | X (F) | | |
| East End (Harrisburg) | Dauphin | 4,000 | Harrisburg | X (F) | | |
| Enhaut | Dauphin | 2,500 | | | | |
| Hershey | Dauphin | 2,500 | Creek | 1,850 (F) | | |
| Linglestown | Dauphin | 718 | | | | |
| Progress | Dauphin | 1,550 | Hummelstown | X (F) | | |
| Rutherford | Dauphin | 580 | Creek | X (1916 (U) | | |
| Union Deposit | Dauphin | 525 | | | | |
| Bainbridge | Lancaster | 827 | | | Public Supply | |
| Bausman | Lancaster | 500 | | | | |
| Brownstown | Lancaster | 800 | | | | |
| East Petersburg | Lancaster | 918 | | | Public Supply | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Unincorporated Towns and Villages | | | | | | |
| Florin | Lancaster | 1,100 | Well & Spring | 600 (C) | | |
| Gap | Lancaster | 1,050 | | | | |
| Holtwood | Lancaster | 526 | River | 225 (F) | | |
| Lampeter | Lancaster | 500 | | | | |
| Landisville | Lancaster | 632 | | | Public Supply | |
| Lincoln | Lancaster | 500 | | | | |
| Maytown | Lancaster | 520 | | | Public Supply | |
| Mechanicsville | Lancaster | 600 | | | Public Supply | |
| Neffsville | Lancaster | 700 | Well | 350 (C) | Public Supply | |
| Reamstown | Lancaster | 700 | | | | |
| Reinholds | Lancaster | 750 | | | Public Supply | |
| Rohrerstown | Lancaster | 625 | | | | |
| Rothsville | Lancaster | 800 | | | | |
| Annville | Lebanon | 2,517 | Spring | 1,500 (C) | | |
| Avon | Lebanon | 550 | Creek | X (1916) (U) | | |
| Campbelltown | Lebanon | 500 | | | | |
| Fredericksburg | Lebanon | 700 | Well | X (1916) (U) | | |
| Quentin | Lebanon | 500 | | | | |
| Schaefferstown | Lebanon | 900 | | | | |
| Atlas | Northumberland | 2,400 | | | | |
| Keiser | Northumberland | 2,000 | | | | |
| Locust Gap | Northumberland | 1,442 | | | | |
| Trevorton | Northumberland | 2,600 | Spring | X (1916) (U) | | |
| Loysville | Perry | 700 | | 400 (C) | Public Supply | Tresslers Orphan Home |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Unincorporated Towns and Villages | | | | | | |
| Branch Dale | Schuylkill | 813 | River | X (1916 (U) | | |
| Brownsville | Schuylkill | 1,000 | | | | |
| Heggins | Schuylkill | 900 | Creek & Spring | 3,500 (C) | | |
| Jackson | Schuylkill | 575 | | | | |
| Lavelle | Schuylkill | 800 | | | | |
| Locustdale | Schuylkill | 1,036 | | | | |
| Lost Creek | Schuylkill | 550 | | | | |
| Muir | Schuylkill | 750 | | | | |
| Orwin | Schuylkill | 600 | | | | |
| Ravine | Schuylkill | 550 | | | | |
| Reiner | Schuylkill | 550 | | | | |
| Shaft | Schuylkill | 1,100 | Creek | X (1916) (U) | | |
| Suedberg | Schuylkill | | | | Public Supply | |
| Valley View | Schuylkill | 1,600 | Spring | X (1916) (U) | | |
| Hummells Wharf | Snyder | 500 | | | | |
| Delroy | York | 500 | | | | |
| Emigsville | York | 516 | Spring | X (1916) (U) | | |
| Pennville | York | 507 | | | | |
| Violet Hill | York | 500 | | | | |
| Townships | | | | | | |
| Coal Twp. | Northumberland | | Creek | 33,000 (C) | | |
| Butler Twp. | Schuylkill | | Creek | 1,000 (C) | | |

Water Supply Systems Potomac Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities and Boro's 25,000 to 50,000 | | | | | | |
| None | | | | | | |
| Cities and Boro's 10,000 to 25,000 | | | | | | |
| Chambersburg | Franklin | 13,722 | Creek | 13,200 (C) | | |
| Waynesboro | Franklin | 9,814 | Creek | 10,200 (C) | | |
| Borough's 5,000 to 10,000 | | | | | | |
| Gettysburg | Adams | 5,776 | Creek | 5,500 (F) | Filter Plant Improvement. New Standpipe | |
| Borough's 2,500 to 5,000 | | | | | | |
| None | | | | | | |
| Borough's 2,500 and Less | | | | | | |
| Fairfield | Adams | 491 | | | Public Supply | |
| Littlestown | Adams | 2,096 | Well & Spring | 1,500 (C) | Extensions | |
| Hyndman | Bedford | 1,200 | Creek | X (1916) (U) | Chlorination Plant | |

Type of Treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
X - Population served not seperated for community.

Water Supply Systems — Potomac Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Greencastle | Franklin | 2,382 | Spring | 2,300 (C) | | |
| Mercersburg | Franklin | 1,758 | Creek | 1,700 (C) | | |
| Mont Alto | Franklin | 710 | Spring & Creek | 1,000*(C) | Public Supply | *Present Supply at Sanitorium |
| McConnellsburg | Fulton | 1,152 | Spring | 800 (C) | Improvements to Chlorination Plant | Order Issued |
| Wellersburg | Somerset | 349 | | | Public Supply | |
| Unincorporated Towns and Villages | | | | | | |
| Iron Springs | Adams | 600 | | | Public Supply | |
| Marion | Franklin | 500 | | | Public Supply | |
| Quincy | Franklin | 800 | Well | 300*(C) | Public Supply | *U.B. Home & Orphanage |
| Rouzerville | Franklin | 950 | Spring & Creek | 800 (C) 1500 (F) | Mixing Basin | |
| Scotland | Franklin | 750 | Spring | 300*(C) | Public Supply | *Present supply at Orphans School |
| Fayetteville | Franklin | 800 | Creek | 600 (C) | | |

Water Supply Systems — Chesapeake Bay

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boro 2,500 to 5,000 | | | | | | |
| Oxford | Chester | 2,579 | Well | 2,600 (C) | | |
| Boro 2,500 and Less | | | | | | |
| New Freedom | York | 1,307 | Well | X (1916)(U) | Chlorination | Order Issued |

Water Supply Systems — Genessee Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Borough's 2,500 and Less | | | | | | |
| Lewisville | Potter | 514 | Well | | | |

WATER SUPPLY STATISTICS

APPENDIX - B

Sewage Disposal Systems — North Branch Susquehanna Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treatment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities over 100,000 | | | * | ** | | | |
| Scranton | Lackawanna | 138,207 | X | | Sewer Ext. | Sewers under Constr. P.W.A. | |
| Cities 50,000 to 100,000 | | | | | | | |
| Wilkes-Barre | Luzerne | 85,259 | X | | | | |
| Cities and Boro's 25,000 to 50,000 | | | | | | | |
| Nanticoke | Luzerne | 26,728 | X | | San. & Comb. Sewers | | |
| Cities and Boro's 10,000 to 25,000 | | | | | | | |
| Berwick | Columbia | 12,582 | X | | | | Nescopeck |
| Carbondale | Lackawanna | 18,851 | X | | | | |
| Dickson | Lackawanna | 12,089 | | | | | |
| Dunmore | Lackawanna | 22,951 | X | | Trunk Line Sewer | | |
| Old Forge | Lackawanna | 12,378 | X | | Comb. Sewer | | |
| Kingston | Luzerne | 20,708 | | | | | |
| Pittston | Luzerne | 19,407 | X | | Add. Sewers | | |
| Plymouth | Luzerne | 16,760 | X | | Add. Sewers | | |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X.

Sewage Disposal Systems — North Branch Susquehanna Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 5,000 to 10,000 | | | | | | | |
| Sayre | Bradford | 6,975 | X | | Disposal Plt. | Order Issued | |
| Bloomsburg | Columbia | 9,607 | X | | | | |
| Archbald | Lackawanna | 9,650 | X | | Sanitary Sewers | | |
| Blakely | Lackawanna | 8,538 | X Part | | Sewer Ext. | | |
| Moosic | Lackawanna | 5,639 | | | New Sewer System | | |
| Olyphant | Lackawanna | 9,860 | X | | | | |
| Taylor | Lackawanna | 9,238 | | | | | |
| Throop | Lackawanna | 8,240 | X | | San. Sewers | | |
| Winton | Lackawanna | 8,445 | | | | | |
| Ashley | Luzerne | 6,902 | | | | | |
| Dupont | Luzerne | 5,165 | | | | | |
| Duryea | Luzerne | 8,217 | X Part | | | | |
| Edwardsville | Luzerne | 8,433 | | | | | |
| Exeter | Luzerne | 5,870 | X | | Comb. outlet sewer in Susque. Riv. | | |
| Forty-Fort | Luzerne | 6,158 | X | | | | |
| Larksville | Luzerne | 8,878 | | | | | |
| Luzerne | Luzerne | 7,661 | | | New Sewer Syst. | | |
| Swoyersville | Luzerne | 9,272 | | | | | |
| West Hazleton | Luzerne | 7,405 | X | | Comb. Sewers Trunk Line Sewers | | |
| West Pittston | Luzerne | 7,652 | X | | | | |
| Danville | Montour | 7,626 | X | | Sewer Ext. Disposal Plant | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 5,000 to 10,000 | | | | | | | |
| McAdoo | Schuylkill | 5,066 | X | | | | |
| Forest City | Susquehanna | 5,045 | X | | | | Browndale & Brandling |
| Boro's 2,500 to 5,000 | | | | | | | |
| Athens | Bradford | 4,325 | X | | | | |
| Towanda | Bradford | 4,020 | X | | | | |
| (Clarks Green ) | Lackawanna | 3,597 | X | X | | | |
| (Clarks Summitt) | Lackawanna | | | | | | |
| Jermyn | Lackawanna | 3,591 | | | | | |
| Mayfield | Lackawanna | 3,628 | | | New Comb. Sewers | | |
| Avoca | Luzerne | 4,697 | X | | | | |
| Hughestown | Luzerne | 2,609 | X | | | | |
| Sugar Notch | Luzerne | 2,843 | | | | | |
| West Wyoming | Luzerne | 2,825 | X | | | | |
| Susquehanna Depot | Susquehanna | 2,752 | X | | | | Landsboro & Oakland Boro |
| Wyoming | Luzerne | 4,627 | X | | | | |
| Boro's 2,500 & Less | | | | | | | |
| Alba | Bradford | 145 | | | | | |
| Burlington | Bradford | 28 | | | | | |
| Canton | Bradford | 1,960 | X | | Disposal Plant | Order Issued | |
| LeRaysville | Bradford | 320 | | | | | |
| Monroe | Bradford | 771 | | | | | |
| New Albany | Bradford | 492 | | | | | |
| Rome | Bradford | 235 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 & Less | | | | | | | |
| South Waverly | Bradford | 1,350 | | | | | |
| Sylvania | Bradford | 184 | | | | | |
| Troy | Bradford | 1,318 | X | X | | | |
| Wyalusing | Bradford | 827 | X | | | | |
| Benton | Columbia | 802 | | | | | |
| Briar Creek | Columbia | 230 | | | | | |
| Catawissa | Columbia | 2,118 | X | | | | |
| Centralia | Columbia | 2,493 | X | | | | |
| Millville | Columbia | 879 | X | | | | |
| Orangeville | Columbia | 428 | | | | | |
| Stillwater | Columbia | 159 | | | | | |
| Dalton | Lackawanna | 1,084 | | | | | |
| Elmhurst | Lackawanna | 787 | | | | | |
| Gouldsboro | Lackawanna | 106 | | | | | |
| Moscow | Lackawanna | 1,087 | | | | | |
| Vandling | Lackawanna | 1,108 | X | | | | |
| Conyngham | Luzerne | 976 | | | | | |
| Courtdale | Luzerne | 1,254 | | | | | |
| Dallas | Luzerne | 1,782 | | | | | |
| Jeddo | Luzerne | 385 | | | | | |
| Laflin | Luzerne | 442 | | | | | |
| Laurel Run | Luzerne | 1,095 | | | | | |
| Nescopeck | Luzerne | 1,779 | | | | | Berwick Boro |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | | |
| New Columbus | Luzerne | 178 | | | | | |
| Pringle | Luzerne | 2,262 | X | | | | |
| Shickshinny | Luzerne | 2,323 | | | | | |
| Warrior Run | Luzerne | 1,407 | | | | | |
| White Haven | Luzerne | 1,677 | | | Sanitary Sewers | | |
| Riverside | Northumberland | 526 | | | | | |
| Ringtown | Schuylkill | 945 | X Part | | | | |
| Friendsville | Susquehanna | 74 | | | | | |
| Great Bend | Susquehanna | 622 | X | | | | |
| Hallstead | Susquehanna | 1,188 | | | | | |
| Hopbottom | Susquehanna | 508 | | | | | |
| Lanesboro | Susquehanna | 647 | X | | | | Susquehanna Depot |
| Little Meadows | Susquehanna | 132 | | | | | |
| Montrose | Susquehanna | 1,769 | X | X | | | |
| New Milford | Susquehanna | 1,230 | | | | | |
| Oakland | Susquehanna | 991 | X | | | | Susquehanna Depot |
| Thompson | Susquehanna | 342 | X | | | | |
| Union Dale | Susquehanna | 377 | | | | | |
| Knoxville | Tioga | 631 | | | | | |
| Lawrenceville | Tioga | 556 | | | | | |
| Mansfield | Tioga | 1,867 | | | | | |
| Roseville | Tioga | 95 | | | | | |

Sewage Disposal Systems | North Branch Susquehanna Basin

| Name of City, Boro or Twp. | County | Estimated Pop -1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | | |
| Tioga | Tioga | 455 | | | | | |
| Westfield | Tioga | 1,227 | X | X | | | |
| Starruca | Wayne | 358 | | | | | |
| Factoryville | Wyoming | 816 | | | | | |
| Laceyville | Wyoming | 437 | | | | | |
| Meshoppen | Wyoming | 541 | | | | | |
| Nicholson | Wyoming | 1,004 | | | | | |
| Tunkhannock | Wyoming | 2,262 | X | | | | |
| Unincorporated Towns & Villages | | | | | | | |
| Monroeton | Bradford | 500 | | | | | |
| Beaver Valley | Columbia | 512 | | | | | |
| Creasy | Columbia | 613 | | | | | |
| Espy | Columbia | 700 | | | | | |
| Midvalley | Columbia | 900 | | | | | |
| Wilburton | Columbia | 550 | | | | | |
| Chinchilla | Lackawanna | 600 | | | | | |
| Eynon | Lackawanna | 2,540 | | | | | |
| Glenburn | Lackawanna | 520 | | | | | |
| Jessup | Lackawanna | 6,000 | | | | | |
| Pyne Breaker | Lackawanna | 500 | | | | | |
| Racket Brook | Lackawanna | 500 | | | | | |
| Rendham | Lackawanna | 538 | | | | | |
| Waverly | Lackawanna | 520 | | | | | |
| Alden | Luzerne | 1,800 | | | | | |
| Alderson | Luzerne | 600 | | | | | |
| Askam | Luzerne | 2,500 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns & Villages | | | | | | | |
| Avondale | Luzerne | 1,042 | | | | | |
| Boulward Manor | Luzerne | | | | | | |
| Breslau | Luzerne | 972 | | | | | |
| Brookside | Luzerne | 2,000 | | | | | |
| Buttonwood | Luzerne | 900 | | | | | |
| Carverton | Luzerne | 500 | | | | | |
| Chauncey | Luzerne | 655 | | | | | |
| Coalridge | Luzerne | 1,000 | | | | | |
| Ebervale | Luzerne | 580 | | | | | |
| Empire | Luzerne | 1,200 | | | | | |
| Fern Glen | Luzerne | 800 | | | | | |
| Georgetown | Luzerne | 2,000 | | | | | |
| Glenlyon | Luzerne | 5,293 | | | | | |
| Gum Run | Luzerne | 500 | | | | | |
| Harleigh | Luzerne | 585 | | | | | |
| Harwood Mine | Luzerne | 960 | | | | | |
| Hemlock Creek | Luzerne | 525 | | | | | |
| Hudson | Luzerne | 2,050 | | | | | |
| Inkerman | Luzerne | 527 | | | | | |
| Lattimer | Luzerne | 1,355 | | | | | |
| Lee Park | Luzerne | 2,000 | | | | | |
| Midvale | Luzerne | 500 | | | | | |
| Miners Mills | Luzerne | 3,000 | | | | | |
| Mocanaqua | Luzerne | 2,800 | | | | See Conyngham (Twp.) | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns & Villages | | | | | | | |
| Mountain Top | Luzerne | 1,150 | | | | | |
| Newtown | Luzerne | 3,000 | | | | | |
| Olivers Mills | Luzerne | 500 | | | | | |
| Parsons | Luzerne | 5,625 | | | | | |
| Retreat | Luzerne | 2,000 | | | | | |
| Rhone | Luzerne | 1,692 | | | | | |
| Stumerville | Luzerne | 5,725 | | | | | |
| Tomhicken | Luzerne | 500 | | | | | |
| Wanamie | Luzerne | 1,536 | | | | | |
| West Nanticoke | Luzerne | 1,811 | | | | | |
| Yatesville | Luzerne | 765 | | | | | |
| Elysburg | Northumberland | 625 | | | | | |
| Ranshaw | " | 2,000 | | | | | |
| Kelayres | Schuylkill | 1,527 | | | | | |
| Nuremberg | Schuylkill | 1,020 | | | | | |
| Oneida | Schuylkill | 1,068 | | | | | |
| Park Place | Schuylkill | 1,219 | | | | | |
| Zion Grove | Schuylkill | 600 | | | | | |
| Covington | Tioga | 500 | | | | | |
| Morris Run | Tioga | 2,352 | | | | | |
| Osceola | Tioga | 568 | | | | | |
| Noxen | Wyoming | 1,100 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Townships | | | | | | | |
| Troy | Bradford | 1,067 | X | X | | | |
| Carbondale | Lackawanna | 1,478 | X Part | | New Sewer System | | |
| Fell | Lackawanna | 5,070 | X Part | X | Sewer Ext. | Serves Carbon-dale Poor Dist. | |
| Scott | Lackawanna | 2,366 | X Part | X | | Serves Beakley Poor District | |
| Conyngham | Luzerne | 2,931 | X Part | X | | Serves Mocanagua | |
| Hanover | Luzerne | 19,067 | X | X | Misc. Sewers | | |
| Newport | Luzerne | 11,991 | X Part | | | | |

Sewage Disposal Systems — West Branch Susquehanna Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treatment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities 25,000 to 50,000 | | | * | ** | | | |
| Williamsport | Lycoming | 44,018 | X | | Intercepting Sewers | | South Williamsport |
| Cities & Boros 10,000 to 25,000 | | | | | | | |
| Lock Haven | Clinton | 10,406 | X | | Sanitary Sewers | | |
| Boros 5,000 to 10,000 | | | | | | | |
| Bellefonte | Centre | 5,339 | X | | Sewers & Disposal Plant | | |
| State College | Centre | 5,494 | X | X | | Disposal Plt. at College | |
| Clearfield | Clearfield | 9,573 | | | | | |
| St. Mary's | Elk | 7,737 | | | | | |
| Jersey Shore | Lycoming | 5,424 | X | | Sewer Disposal | | |
| South Williamsport | Lycoming | 5,948 | X | | | | Williamsport |
| Milton | Northumberland | 8,650 | X | | Sanitary Sewers | | |
| Boros 2,500 to 5,000 | | | | | | | |
| Barnesboro | Cambria | 3,971 | X | | | | Spangler |
| Gallitzin | Cambria | 3,847 | | | | | |
| Patton | Cambria | 3,154 | X | | | | Sankertown |

* Existing public sewers designated by X.  ** Existing sewage treatment plant designated by X.

Sewage Disposal Systems — West Branch Susquehanna Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boros 2,500 to 5,000 | | | | | | | |
| Spangler | Cambria | 2,734 | X | | | | Barnesboro |
| Emporium | Cameron | 3,057 | | | | | |
| Phillipsburg | Centre | 4,088 | X | | | | |
| Curwensville | Clearfield | 3,194 | X | | Disposal Plt. | | |
| Renovo | Clinton | 3,930 | X | | Disposal Plt. | | South Renovo |
| Montoursville | Lycoming | 3,093 | | | | | |
| Muncy | Lycoming | 4,268 | X | | | | |
| Northumberland | Northumber-land | 4,330 | X | | | | |
| Wellsboro | Tioga | 3,774 | X | X | | | |
| Lewisburg | Union | 3,878 | X | | | | |
| Boros 2,500 and Less | | | | | | | |
| Ashville | Cambria | 627 | | | | | |
| Carrolltown | Cambria | 1,367 | X | | | | Sankertown |
| Chest Springs | Cambria | 161 | | | | | |
| Hastings | Cambria | 2,219 | X | | | | Sankertown |
| Loretto | Cambria | 445 | X | X | | | Sankertown |
| Sankertown | Cambria | 953 | X | | | | Cresson |
| Driftwood | Cameron | 308 | | | | | |
| Centre Hall | Centre | 675 | | | | | |
| Howard | Centre | 705 | | | | | |
| Milesburg | Centre | 679 | | | | | |
| Port Matilda | Centre | 589 | | | | | |
| Snow Shoe | Centre | 672 | | | | | |
| South Phillipsburg | Centre | 507 | | | | | |
| Unionville | Centre | 310 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boros 2,500 and Less | | | | | | | |
| Brisbin | Clearfield | 488 | | | | | |
| Burnside | Clearfield | 424 | | | | | |
| Chester Hill | Clearfield | 956 | | | | | |
| Coalport | Clearfield | 1,206 | | | | | |
| Glen Hope | Clearfield | 158 | | | | | |
| Grampian | Clearfield | 654 | X Part | | | | |
| Houtzdale | Clearfield | 1,456 | | | | | |
| Irvona | Clearfield | 1,042 | | | | | |
| Lumber City | Clearfield | 309 | | | | | |
| Mahaffey | Clearfield | 622 | X | | | | |
| Newburg | Clearfield | 151 | | | | | |
| Osceola Mills | Clearfield | 2,032 | X | | | | |
| Ramey | Clearfield | 813 | | | | | |
| Wallaceton | Clearfield | 386 | | | | | |
| Westover | Clearfield | 689 | | | | | |
| Avis | Clinton | 1,132 | X | | Combined Sewer System | | |
| Beech Creek | Clinton | 689 | | | | | |
| Flemington | Clinton | 1,184 | | | | | |
| Loganton | Clinton | 352 | | | | | |
| Mill Hall | Clinton | 677 | X | | | | |
| South Renovo | Clinton | 1,076 | X | | | | Renovo |
| Cherrytree | Indiana | 524 | | | | | |
| Glen Campbell | Indiana | 628 | | | | | |
| Duboistown | Lycoming | 1,059 | | | | | |
| Hughesville | Lycoming | 1,892 | | | | | |

**Sewage Disposal Systems** West Branch Susquehanna Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boros 2,500 and Less | | | | | | | |
| Montgomery | Lycoming | 2,164 | X | | Complete Sanitary Sewer | | |
| Picture Rocks | Lycoming | 519 | | | | | |
| Salladasburg | Lycoming | 247 | | | | | |
| Washingtonville | Montour | 232 | | | | | |
| McEwensville | Northumberland | 226 | | | | | |
| Turbotville | Northumberland | 491 | | | | | |
| Watsontown | " | 2,304 | X | | Sanitary Sewers | | |
| Austin | Potter | 1,135 | X | | | | |
| Galeton | Potter | 1,928 | | | | | |
| Dushore | Sullivan | 832 | | | | | |
| Eagles Mere | Sullivan | 266 | X | | | | |
| Forksville | Sullivan | 150 | | | | | |
| Laporte | Sullivan | 246 | | | | | |
| Blossburg | Tioga | 1,637 | X | | | | |
| Liberty | Tioga | 255 | | | | | |
| Mifflinburg | Union | 2,194 | X | | | | |
| Unincorporated Towns and Villages | | | | | | | |
| Bakerton | Cambria | 1,200 | | | | | |
| Blandburg | Cambria | 1,821 | | | | | |
| Emeigh | Cambria | 1,750 | | | | | |
| Marsteller | Cambria | 1,100 | | | | | |
| Saint Benedict | Cambria | 600 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat- ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns and Villages | | | | | | | |
| Sinnemahoning | Cameron | 500 | | | | | |
| Blanchard | Centre | 531 | | | | | |
| Clarence | Centre | 800 | | | | | |
| Miles | Centre | 600 | | | | | |
| Orviston | Centre | 528 | | | | | |
| Pleasant Gap | Centre | 900 | | | | | |
| Beulah | Clearfield | 500 | | | | | |
| Blue Ball | Clearfield | 900 | | | | | |
| Grassflat | Clearfield | 1,200 | | | | | |
| Hawk Run | Clearfield | 663 | | | | | |
| Karthaus | Clearfield | 550 | | | | | |
| Kylertown | Clearfield | 500 | | | | | |
| Madera | Clearfield | 1,136 | | | | | |
| Morann | Clearfield | 1,047 | | | | | |
| Morrisdale | Clearfield | 1,100 | | | | | |
| Munson | Clearfield | 650 | | | | | |
| Penfield | Clearfield | 816 | | | | | |
| Rose Bud | Clearfield | 1,000 | | | | | |
| Smithmill | Clearfield | 618 | | | | | |
| Smokerun | Clearfield | 592 | | | | | |
| Tyler | Clearfield | 2,036 | | | | | |
| Wigton (Chester Hill) | Clearfield | 786 | | | | | |
| Williams Grove | Clearfield | 600 | | | | | |
| Winburne | Clearfield | 1,285 | | | | | |
| Woodland | Clearfield | 1,000 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns and Villages | | | | | | | |
| Gleasonton | Clinton | 500 | | | | | |
| North Bend | Clinton | 816 | | | | | |
| Byrnedale | Elk | 619 | | | | | |
| Force | Elk | 1,100 | | | | | |
| Billman | Lycoming | 3,000 | | | | | |
| Ralston | Lycoming | 1,000 | | | | | |
| Warrensville | Lycoming | 715 | | | | | |
| Bernice | Sullivan | 618 | | | | | |
| Lopez | Sullivan | 800 | | | | | |
| Mildred | Sullivan | 728 | | | | | |
| Arnot | Tioga | 648 | | | | | |
| Hoytville | Tioga | 572 | | | | | |
| West Milton | Union | 775 | X | X | | | |
| Townships | | | | | | | |
| Karthaus Twp | Clearfield | 854 | | | New Sanitary Sewer | | |
| Loyalsock Twp | Lycoming | 2,833 | X | | | | |
| Nippenose Twp | Lycoming | 579 | | | Sewer & Disposal Plant | | |
| Porter Twp | Lycoming | 932 | X | | | | |
| Delaware Twp | Northumberland | 1,590 | | | Combined Sewer | | Dewart & Goosetown |
| Kelly Twp | Union | 1,664 | X | | | | |
| White Deer Twp | Union | 1,929 | X | | | | |

Sewage Disposal Systems — Juniata Sub-Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | * | ** | | | |
| Altoona | Blair | 79,843 | X | X | Improved Sewers & Disposal Plant | | |
| Cities & Boro's 25,000 to 50,000 | | | | | | | |
| None | | | | | | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | | |
| Lewistown | Mifflin | 19,294 | X | | | | Burnham & Highland Park |
| Boro's 5,000 to 10,000 | | | | | | | |
| Hollidaysburg | Blair | 5,927 | X | | Disposal Plant | Order Issued | |
| Tyrone | Blair | 9,075 | X | | Disposal Plant | Order Issued | |
| Huntingdon | Huntingdon | 7,485 | X | | Disposal Plant | Order Issued | Smithfield Twp. |
| Mount Union | Huntingdon | 5,107 | X | | Disposal Plant | Order Issued | |
| Boro's 2,500 to 5,000 | | | | | | | |
| Bedford | Bedford | 3,272 | X | | Disposal Plant and Sewers | Order Issued | |
| Bellwood | Blair | 2,674 | | | Disposal Plant and New Sewers | | |
| Roaring Spring | Huntingdon | 2,957 | | | | | |
| Burnham | Mifflin | 3,227 | X | | | | Lewistown |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X.

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | | |
| Coaldale | Bedford | 269 | | | | | |
| Everett | Bedford | 1,991 | X | | Sanitary Sewers | | |
| Hopewell | Bedford | 427 | | | New Sewer System | | |
| Manns Choice | Bedford | 280 | | | | | |
| New Paris | Bedford | 194 | | | | | |
| Pleasantville | Bedford | 204 | | | | | |
| Rainsburg | Bedford | 259 | | | | | |
| Saxton | Bedford | 1,201 | | | | | |
| Schellsburg | Bedford | 323 | | | | | |
| Saint Clairsville | Bedford | 108 | | | | | |
| Woodbury | Bedford | 1,097 | | | | | |
| Duncansville | Blair | 1,281 | | | | | |
| Martinsburg | Blair | 1,409 | | | | | |
| Newry | Blair | 635 | | | | | |
| Williamsburg | Blair | 2,386 | | | | | |
| Tunnel Hill | Cambria | 676 | | | | | |
| Alexandria | Huntingdon | 457 | | | | | |
| Birmingham | Huntingdon | 217 | | | | | |
| Broad Top City | Huntingdon | 541 | | | | | |
| Cassville | Huntingdon | 122 | | | | | |
| Coalmont | Huntingdon | 169 | | | | | |
| Dudley | Huntingdon | 418 | | | | | |
| Mapleton | Huntingdon | 840 | | | | | |
| Marklesburg | Huntingdon | 299 | | | | | |
| Mill Creek | Huntingdon | 364 | | | | | |
| Orbisonia | Huntingdon | 897 | | | Combined Sewer System | | |

Sewage Disposal Systems — Juniata Sub-Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | | |
| Petersburg | Huntingdon | 687 | | | | | |
| Rockhill | Huntingdon | 609 | | | | | |
| Saltillo | Huntingdon | 445 | | | | | |
| Shade Gap | Huntingdon | 94 | | | | | |
| Shirleysburg | Huntingdon | 241 | X | | Disposal Plant | | |
| Three Springs | Huntingdon | 428 | | | | | |
| Mifflin | Juniata | 1,064 | X | | | | |
| Mifflintown | Juniata | 1,090 | X | | | | |
| Port Royal | Juniata | 830 | X | | | | |
| Thompsontown | Juniata | 482 | | | | | |
| Kistler | Mifflin | 513 | | | | | |
| McVeytown | Mifflin | 481 | | | | | |
| Newton Hamilton | Mifflin | 392 | | | | | |
| Millerstown | Perry | 728 | | | New Sewer System | | |
| Newport | Perry | 1,891 | X | | | | |
| New Baltimore | Somerset | 155 | | | | | |
| Unincorporated Towns and Villages | | | | | | | |
| Earlston | Bedford | 1,000 | | | | | |
| Riddlesburg | Bedford | 610 | | | | | |
| Claysburg | Blair | 1,400 | | | | | |
| Greenfield | Blair | 1,400 | | | | | |
| Greenwood | Blair | | | | | | |
| Lakemont | Blair | 1,256 | | | | | |
| South Altoona | Blair | 940 | | | | | |
| South Lakemont | Blair | 1,832 | | | | | |
| Coupon | Cambria | 500 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns and Villages | | | | | | | |
| Robertsdale | Huntingdon | 651 | | | | | |
| South Huntingdon | Huntingdon | 850 | | | | | |
| Woodvale | Huntingdon | 1,500 | | | | | |
| Belleville | Mifflin | 1,156 | | | | | |
| Milroy | Mifflin | 1,600 | | | | | |
| Yeagertown | Mifflin | 1,900 | X | | | | |
| Townships | | | | | | | |
| Smithfield Twp | Huntingdon | 2,817 | X | | | | Huntingdon |
| Wood Twp | Huntingdon | 1,815 | X | | | | Robertsdale |
| Derry Twp | Mifflin | 5,143 | X | | | | Lewistown |

Sewage Disposal Systems — Lower Susquehanna Sub-Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities 50,000 to 100,000 | | | * | ** | | | |
| Harrisburg | Dauphin | 79,620 | X | | Sanitary Sewers & Disposal Plant | | Paxtang & Steelton |
| Lancaster | Lancaster | 59,982 | X | X | | | |
| York | York | 62,508 | X | X | | | |
| Cities & Boro's 25,000 to 50,000 | | | | | | | |
| Lebanon | Lebanon | 25,690 | X | X | Add. Sewers & Disposal Plant Add. | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | | |
| Carlisle | Cumberland | 13,153 | X | X | Sewer Extension | | |
| Steelton | Dauphin | 13,493 | X | | | | Paxtang & Harrisburg |
| Columbia | Lancaster | 12,026 | X | | | | |
| Mount Carmel | Northumber-land | 18,238 | X | | | Combined Truck Sewer | |
| Shamokin | Northumber-land | 20,257 | X | | | Combined Sanitary Sewer | |
| Sunbury | Northumber-land | 15,582 | X | | | | |
| Mahanoy City | Schuylkill | 13,905 | X | | | | |
| Shenandoah | Schuylkill | 21,057 | X | | | | |
| Hanover | York | 11,716 | X | X | | | |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X.

Sewage Disposal Systems — Lower Susquehanna Sub-Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 5,000 to 10,000 | | | | | | | |
| Mechanicsburg | Cumberland | 6,542 | | | | | |
| New Cumberland | Cumberland | 4,806 | X | | | | |
| Middletown | Dauphin | 6,601 | X | | | | |
| Ephrata | Lancaster | 6,190 | | | | | |
| Kulpmont | Northumberland | 6,339 | X | | | | |
| Ashland | Schuylkill | 7,040 | X | | | | |
| Frackville | Schuylkill | 8,545 | X | | Sewer Ext. | | |
| Girardville | Schuylkill | 5,181 | X | | | | |
| West York | York | 5,355 | | | Sewers | | |
| Boro's 2,500 to 5,000 | | | | | | | |
| Abbottstown | Adams | 4,045 | | | | | |
| Camp Hill | Cumberland | 3,642 | | | Sewers | Under Construction | |
| Lemoyne | Cumberland | 4,241 | | | | | |
| Shippensburg | Cumberland | 4,670 | | | | | |
| Highspire | Dauphin | 2,563 | | | | | |
| Hummelstown | Dauphin | 2,997 | | | | | |
| Lykens | Dauphin | 3,474 | X | | | | |
| Millersburg | Dauphin | 3,160 | | | | | |
| Penbrook | Dauphin | 3,451 | | | Sewers | Under Construction P.W.A. | |
| Williamstown | Dauphin | 3,194 | | | | | |
| Elizabethtown | Lancaster | 4,005 | X | X | | | |
| Lititz | Lancaster | 4,533 | | | | | |
| Manheim | Lancaster | 3,821 | | | Disposal Plt. | | |
| Mount Joy | Lancaster | 2,954 | | | | | |
| Palmyra | Lebanon | 4,809 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 to 5,000 | | | | | | | |
| Gilberton | Schuylkill | 3,956 | X | | | | |
| Tower City | Schuylkill | 2,842 | | | | | |
| Selinsgrove | Snyder | 2,802 | X | | | | |
| Dallastown | York | 2,760 | | | | | |
| Red Lion | York | 4,827 | | | | | |
| Boro's 2,500 and Less | | | | | | | |
| Arendtsville | Adams | 491 | | | | | |
| Bendersville | Adams | 385 | | | | | |
| Biglerville | Adams | 539 | | | | | |
| East Berlin | Adams | 783 | | | | | |
| McSherrystown | Adams | 2,099 | | | | | |
| New Oxford | Adams | 1,144 | X | | | | |
| York Springs | Adams | 362 | | | | | |
| Millheim | Centre | 602 | | | | | |
| Atglen | Chester | 554 | | | | | |
| Mount Holly Springs | Cumberland | 1,183 | | | | | |
| Newburg | Cumberland | 271 | | | | | |
| Newville | Cumberland | 1,719 | | | | | |
| Shiremanstown | Cumberland | 710 | | | | | |
| West Fairview | Cumberland | 1,965 | | | | | |
| Wormleysburg | Cumberland | 1,662 | | | | | |
| Berrysburg | Dauphin | 413 | | | | | |
| Dauphin | Dauphin | 613 | | | | | |
| Elizabethville | Dauphin | 1,402 | X | | | | |
| Gratz | Dauphin | 668 | | | | | |
| Halifax | Dauphin | 855 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | | |
| Paxtang | Dauphin | 1,540 | X | | | | Steelton & Harrisburg |
| Royalton | Dauphin | 1,412 | | | | | |
| Uniontown | Dauphin | 518 | | | | | |
| Orrstown | Franklin | 193 | | | | | |
| Adamstown | Lancaster | 928 | | | | | |
| Akron | Lancaster | 1,203 | | | | | |
| Christiana | Lancaster | 1,050 | X | | | | |
| Denver | Lancaster | 1,581 | | | | | |
| Marietta | Lancaster | 2,054 | | | | | |
| Millersville | Lancaster | 1,970 | | | | | |
| Mountville | Lancaster | 982 | | | | | |
| New Holland | Lancaster | 1,682 | | | | | |
| Quarryville | Lancaster | 1,047 | | | | | |
| Strasburg | Lancaster | 972 | | | | | |
| Terre Hill | Lancaster | 910 | | | | | |
| Washington | Lancaster | 473 | | | | | |
| Cleona | Lebanon | 1,262 | | | | | |
| Cornwall | Lebanon | 1,860 | | | | | |
| Jonestown | Lebanon | 636 | | | | | |
| Lebanon Ind. | Lebanon | 2,125 | | | | | |
| Mount Gretna | Lebanon | 22 | X | X | | | |
| Herndon | Northumberland | 736 | | | New Sanitary Sewer | | |
| Marion Heights | Northumberland | 2,028 | X | | Combined System & Outfall Sewer | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 & Less | | | | | | | |
| Snydertown | Northumber-land | 302 | | | | | |
| Blain | Perry | 288 | | | | | |
| Bloomfield | Perry | 891 | | | | | |
| Duncannon | Perry | 1,706 | | | | | |
| Landisburg | Perry | 253 | | | | | |
| Liverpool | Perry | 576 | | | | | |
| Marysville | Perry | 1,884 | | | | | |
| New Buffalo | Perry | 119 | | | | | |
| Gordon | Schuylkill | 1,092 | | | | | |
| Pine Grove | Schuylkill | 2,268 | X | | | | |
| Tremont | Schuylkill | 2,315 | | | | | |
| Beavertown | Snyder | 931 | | | | | |
| Middleburg | Snyder | 1,061 | | | | | |
| Shamokin Dam | Snyder | 766 | | | | | |
| Hartleton | Union | 189 | | | | | |
| New Berlin | Union | 574 | | | | | |
| Cross Roads | York | 159 | | | | | |
| Delta | York | 796 | | | | | |
| Dillsburg | York | 1,122 | | | | | |
| Dover | York | 817 | | | | | |
| East Prospect | York | 394 | | | | | |
| Fawn Grove | York | 313 | | | | | |
| Felton | York | 416 | | | | | |
| Franklintown | York | 306 | | | | | |
| Glen Rock | York | 1,338 | | | | | |

Sewage Disposal Systems — Lower Susquehanna Sub-Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 and Less | | | | | | | |
| Goldsboro | York | 485 | | | | | |
| Hallam | York | 653 | | | | | |
| Jefferson | York | 501 | | | | | |
| Jacobus | York | 615 | | | | | |
| Lewisberry | York | 267 | | | | | |
| Loganville | York | 334 | | | | | |
| Manchester | York | 1,112 | | | | | |
| Mount Wolfe | York | 957 | | | | | |
| New Freedom | York | 1,307 | | | | | |
| New Salem | York | 362 | | | | | |
| North York | York | 2,376 | | | | | |
| Railroad | York | 268 | X | | | | |
| Seven Valleys | York | 382 | | | | | |
| Shrewsbury | York | 665 | | | | | |
| Spring Grove | York | 1,297 | X | | | | |
| Stewartstown | York | 966 | | | | | |
| Wellsville | York | 335 | | | | | |
| Windsor | York | 1,094 | | | | | |
| Winterstown | York | 229 | | | | | |
| Wrightsville | York | 2,153 | X | X | | | |
| Yoe | York | 598 | | | | | |
| Yorkana | York | 316 | | | | | |
| York Haven | York | 948 | | | | | |

Sewage Disposal Systems — Lower Susquehanna Sub-Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns & Villages | | | | | | | |
| Boiling Springs | Cumberland | 1,000 | | | | | |
| Enola | Cumberland | 2,600 | X | X | | | |
| Derry Church | Dauphin | 1,000 | | | | | |
| East End, Harrisburg | Dauphin | 4,000 | | | | | |
| Enhaut | Dauphin | 2,500 | | | | | |
| Hershey | Dauphin | 2,500 | X | X | | | |
| Linglestown | Dauphin | 718 | | | | | |
| Progress | Dauphin | 1,550 | | | | | |
| Rutherford | Dauphin | 580 | | | | | |
| Union Deposit | Dauphin | 525 | | | | | |
| Bainbridge | Lancaster | 827 | | | | | |
| Bausman | Lancaster | 500 | | | | | |
| Brownstown | Lancaster | 800 | | | | | |
| East Petersburg | Lancaster | 918 | | | | | |
| Florin | Lancaster | 1,100 | | | | | |
| Gap | Lancaster | 1,050 | | | | | |
| Holtwood | Lancaster | 526 | | | | | |
| Lampeter | Lancaster | 500 | | | | | |
| Landisville | Lancaster | 632 | | | | | |
| Lincoln | Lancaster | 500 | | | | | |
| Maytown | Lancaster | 520 | | | | | |
| Mechanicsville | Lancaster | 600 | | | | | |
| Neffsville | Lancaster | 700 | | | | | |
| Reamstown | Lancaster | 700 | | | | | |
| Reinholds | Lancaster | 750 | | | | | |
| Rohrerstown | Lancaster | 625 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns & Villages | | | | | | | |
| Rothsville | Lancaster | 800 | | | | | |
| Annville | Lebanon | 2,517 | | | | | |
| Avon | Lebanon | 550 | | | | | |
| Campbelltown | Lebanon | 500 | | | | | |
| Fredericksburg | Lebanon | 700 | | | | | |
| Quentin | Lebanon | 500 | | | | | |
| Schaefferstown | Lebanon | 900 | | | | | |
| Atlas | Northumber-land | 2,400 | | | | | |
| Keiser | Northumber-land | 2,000 | | | | | |
| Locust Gap | Northumber-land | 1,442 | | | | | |
| Trevorton | Northumber-land | 2,600 | | | | | |
| Loysville | Perry | 700 | | | | | |
| Branch Dale | Schuylkill | 813 | | | | | |
| Brownsville | Schuylkill | 1,000 | | | | | |
| Heggins | Schuylkill | 900 | | | Sewers | Sewer Under Construction | |
| Jackson | Schuylkill | 575 | | | | | |
| Lavelle | Schuylkill | 800 | | | | | |
| Locust Dale | Schuylkill | 1,036 | | | | | |
| Lost Creek | Schuylkill | 550 | | | | | |
| Muir | Schuylkill | 750 | | | | | |
| Orwin | Schuylkill | 600 | | | | | |
| Ravine | Schuylkill | 550 | | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns & Villages | | | | | | | |
| Reiner | Schuylkill | 550 | | | | | |
| Shaft | Schuylkill | 1,100 | | | | | |
| Suedberg | Schuylkill | | | | | | |
| Valley View | Schuylkill | 1,600 | | | | | |
| Hummells Wharf | Snyder | 500 | | | | | |
| Delroy | York | 500 | | | | | |
| Emigsville | York | 516 | | | | | |
| Pennville | York | 507 | | | | | |
| Violet Hill | York | 500 | | | | | |
| Townships | | | | | | | |
| Coal Twp | Northumberland | | X | | | | |

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities & Boro's 10,000 to 25,000 | | | * | ** | | | |
| Chambersburg | Franklin | 13,722 | X | X | Ext. of Sanitary Sewers | | |
| Waynesboro | Franklin | 9,814 | X | X | Sanitary Sewers Finish Disposal Plt. | | |
| Boro's 5,000 to 10,000 | | | | | | | |
| Gettysburg | Adams | 5,776 | X | X | Secondary Treat-ment Plant | | |
| Boro's of 2,500 & Less | | | | | | | |
| Fairfield | Adams | 491 | | | | | |
| Littlestown | Adams | 2,096 | | | Sewers & Pri. Treatment | No Plans | |
| Hyndman | Bedford | 1,200 | X (Partial) | | San. Sewers & Primary Treat. | Order Issued | |
| Greencastle | Franklin | 2,382 | | | Sewers & Pri. Treatment | | |
| Mercersburg | Franklin | 1,758 | | | Sewers & Primary Treatment | | |
| Mont Alto | Franklin | 710 | X | X | | | Plant at Mt. Alto San. |
| McConnellsburg | Fulton | 1,152 | X | X | | | |
| Wellersburg | Somerset | 349 | | | | | |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X.

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Unincorporated Towns & Villages | | | | | | | |
| Iron Springs | Adams | 600 | | | | | |
| Marion | Franklin | 500 | | | | | |
| Quincy | Franklin | 800 | | X* | | *Orphanage has Treatment Plt. | |
| Rouzerville | Franklin | 950 | | | | | |
| Scotland | Franklin | 750 | | X* | | *Plant at Orphans Home | |
| Fayetteville | Franklin | 800 | | | | | |

Sewage Disposal Systems — Chesapeake Bay Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 to 5,000 | | | * | ** | | | |
| Oxford | Chester | 2,579 | X | | | | |
| Boro's 2,500 & Less | | | | | | | |
| New Freedom | York | 1,307 | | | | | |

Sewage Disposal Systems — Genesee Basin

| Name of City, Boro or Twp. | County | Estimated Pop.-1934 | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Boro's 2,500 & Less | | | * | ** | | | |
| Lewisville | Potter | 514 | | | | | |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X

# DRAINAGE BASIN STUDY

# OF

# PENNSYLVANIA

## PART III

## UPPER OHIO AND BEAVER RIVERS

## AND LAKE ERIE

PENNSYLVANIA STATE PLANNING BOARD
HARRISBURG, PA.



- 1937 -

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928 North Third Street
Harrisburg, Pennsylvania

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG

928 North Third Street

December 31, 1937

Honorable George H. Earle, III
Governor of Pennsylvania
Harrisburg, Pennsylvania

Dear Governor Earle:

On behalf of the State Planning Board, I respectfully submit to you the three volumes of the DRAINAGE BASIN STUDY OF PENNSYLVANIA.

This report contains detailed information and data concerning Pennsylvania's water resources and problems, which had not been assembled hitherto. It is presented as a reference work for the various State Departments, Federal Agencies and Health and Water Engineers.

Sincerely yours,

Ralph M. Bashore

Ralph M. Bashore
Chairman

RMB:MH

COMMONWEALTH OF PENNSYLVANIA
STATE PLANNING BOARD
HARRISBURG

928 North Third Street

December 15, 1937

Hon. Ralph M. Bashore, Chairman
State Planning Board
Harrisburg, Pennsylvania

Dear Mr. Bashore:

The Staff of the State Planning Board herewith respectfully submits Part III of the Drainage Basin Study of Pennsylvania.

This, the last of three volumes, covers the Upper Ohio River, Beaver River and Lake Erie Drainage Basins.

George R. Copeland, Assistant Director, and James A. Patterson, Research and Planning Supervisor, supervised the compilation of the data contained in this report. Mr. Patterson was also responsible for the arrangement of this material for publication.

A complete statement of the objectives of this study together with acknowledgments to cooperating agencies are included in the preface.

Very truly yours,

F. A. Pitkin
Executive Director

FAP:MH

# PREFACE

Studies of the Drainage Basins in the United States were initiated by the Water Resources Committee of the National Resources Committee early in 1936, and were carried out in collaboration with the Planning Boards of the cooperating States. Water Consultants were appointed by the National Resources Committee for each major Drainage Basin. The Pennsylvania State Planning Board cooperated with the Consultants in the collection and compilation of data for these studies. The objectives of the studies were:

(1) To determine the principal water problems in the various drainage areas of the country.

(2) To outline an integrated pattern of water development and control designed to solve those problems.

(3) To present specific construction projects and investigation projects as elements of the integrated pattern or plan, with priorities of importance and time.

This report presents data and information furnished to the Water Consultants for the preparation of the National Resources Committee Report, "Drainage Basin Problems and Programs", December, 1936. Inasmuch as the report of the National Resources Committee is a summary report, most of the available detailed supporting information was not published. It is the purpose of this report to make available to the water and health engineers, and to the interested State Departments and Federal Bureaus, as reference material, the detailed information and data collected by the Pennsylvania State Planning Board.

Due to the limitations of time and personnel, it was not possible to make detailed studies of projects submitted, especially with regard to cost estimates. Some meritorious projects have undoubtedly been omitted

due to lack of information, and some others which are included may be under construction at the present time. In many cases the proposed projects for new public water supplies included no plans or cost estimates. These projects are shown on the Project Map as proposed untreated water supplies pending the receipt of information concerning the type of treatment necessary.

This report is not to be regarded as complete or final, but rather as a preliminary report, subject to corrections and refinements, from which it is hoped that a satisfactory plan for water use development in Pennsylvania may be evolved. Communications regarding corrections and additions will be welcomed by the Pennsylvania State Planning Board.

Grateful acknowledgment is made to the members of the Water Resources Sub-Committee of the State Planning Board for their generous contributions of advice and information which made these studies possible.

Further acknowledgment is made to the various State Departments and Federal Agencies for their cooperation in making available data and information.

Acknowledgment is likewise made for technical, clerical, drafting, and duplicating assistance furnished by the Works Progress Administration under the Federally sponsored project #265-6905.

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of the

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Frederick H. Fowler, Director
Morton L. Emerson, Assistant Director
B. S. Drane, Office Coordinator
H. T. Critchlow, Regional Coordinator
J. W. Guilday, Administrative Assistant

National Resources Committee Consultants and assistants in direct charge of the portion of the study dealing with Pennsylvania.

| | | |
|---|---|---|
| Delaware Basin | - | N. B. Jacobs, Regional Consultant<br>I. S. Walker, Associate Consultant<br>E. O. Goldstein, Jr. Asst. Engineer |
| Susquehanna Basin | - | N. B. Jacobs, Regional Consultant<br>M. B. Moore, Jr. Asst. Engineer |
| Upper Ohio Basin | - | F. H. Weed, Regional Consultant<br>D. E. Davis, Associate Consultant |
| Potomac Basin | - | W. M. Piatt, Regional Consultant |
| Chesapeake Basin | - | W. M. Piatt, Regional Consultant |
| Lake Erie Basin | - | L. K. Sherman, Regional Consultant |
| Genesee Basin | - | L. K. Sherman, Regional Consultant |

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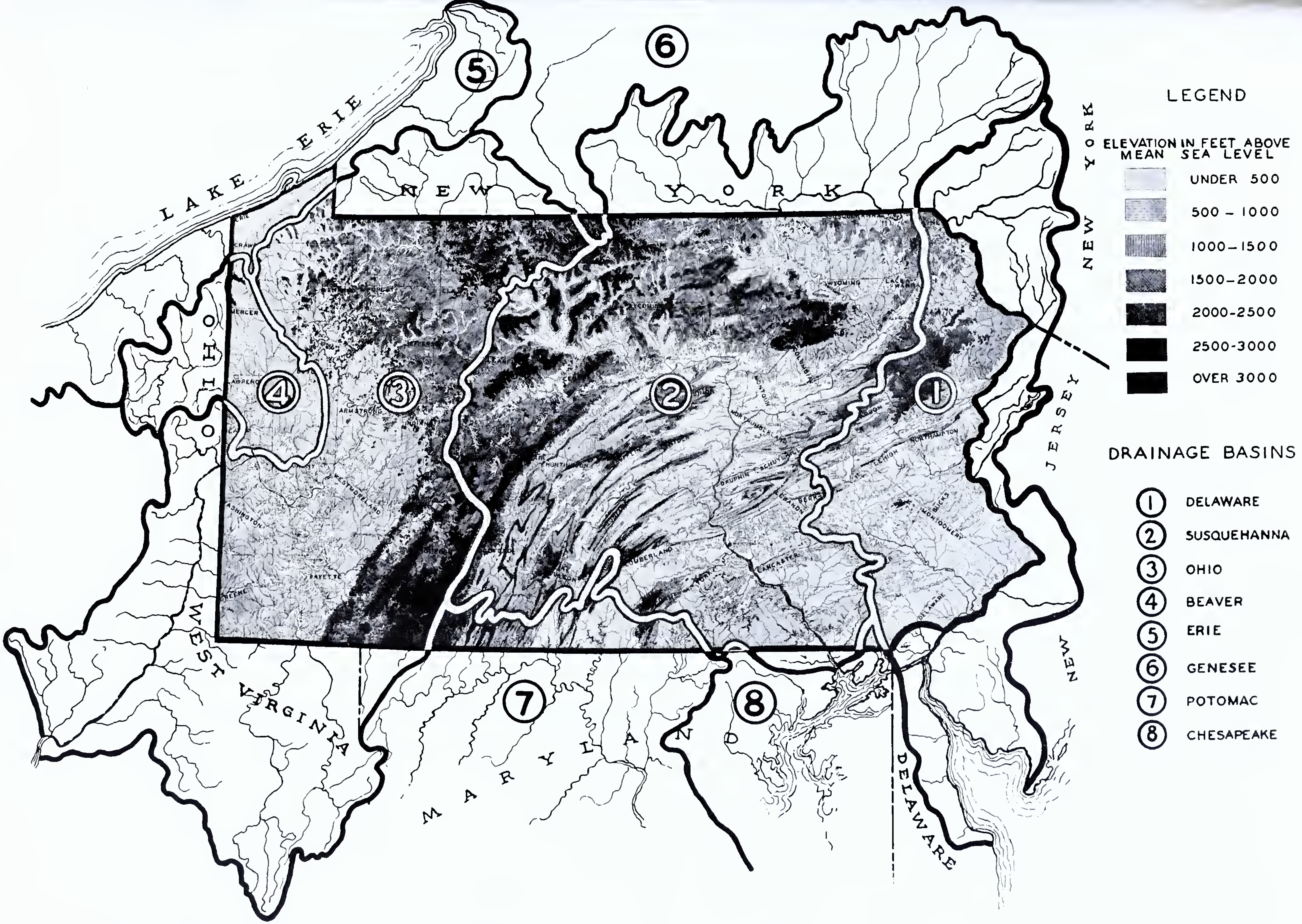


Pennsylvania's Drainage Structure

(Frontispiece)

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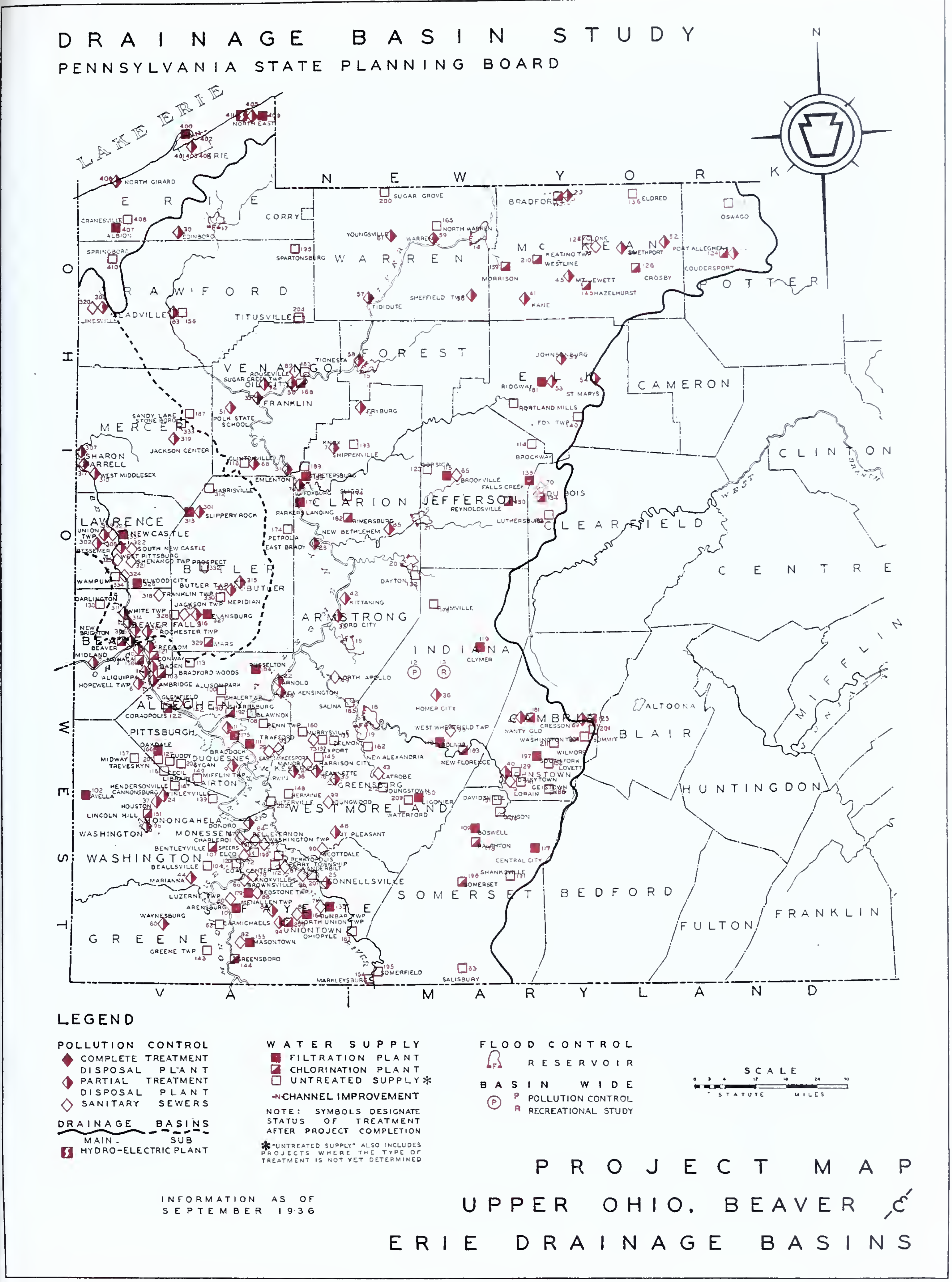
Part III

FIGURES



TABLES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MAIN
SUB
HYDRO-ELECTRIC PLANT
WATER SUPPLY
FILTRATION PLANT
CHLORINATION PLANT
UNTREATED SUPPLY*
CHANNEL IMPROVEMENT
NOTE: SYMBOLS DESIGNATE STATUS OF TREATMENT AFTER PROJECT COMPLETION
*"UNTREATED SUPPLY" ALSO INCLUDES PROJECTS WHERE THE TYPE OF TREATMENT IS NOT YET DETERMINED
FLOOD CONTROL
RESERVOIR
BASIN WIDE
P POLLUTION CONTROL
R RECREATIONAL STUDY
SCALE
STATUTE MILES
INFORMATION AS OF SEPTEMBER 1936
PROJECT MAP
UPPER OHIO, BEAVER & ERIE DRAINAGE BASINS

FIGURE I

## I GENERAL DESCRIPTION OF THE UPPER OHIO BASIN 1/

(a) Length:---Maximum 168 miles. (Penna. portion of Upper Ohio Basin)

(b) Breadth:---Maximum 130 miles. (Penna. portion of Upper Ohio Basin)

(c) Area:---Portion in Pennsylvania 13,787 Square Miles.

(d) Physiography:---The entire Basin 2/ lies within the Allegheny Plateau region, of the Appalachian Highlands.

1. Topography:---Largely highlands, carved deeply with many narrow, steep sided valleys. The eastern portion is of a rugged hilly nature; while the areas to the west are less rugged in character, being mostly rolling agricultural country beyond the steep slope of the main valley. In the northern portion, the country is flatter and contains many small lakes and swamps.

2. Geology:---The terminal moraine traverses the Basin from northeast to southwest involving a small stretch of the Allegheny River at Olean, New York, the remaining part of the moraine lying a few miles north of the Allegheny River, crossing Conewago Creek 8 miles north of Warren, and French Creek 5 miles above Franklin. The glaciated region covers approximately 25 percent of the Basin and abounds in lakes and swamps.

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1/ Source:---Paragraphs (a) and (b).--Scaled from Stream Map of Pennsylvania-scale 6 miles = 1 inch.
Paragraphs (c) and (d).--Water Resources Inventory Report, Part III-Gazetteer of Streams.-Pennsylvania Water Supply Commission, Harrisburg, Pennsylvania, 1916.
Paragraph (f) Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934 - Page 71.

2/ All further references to the Upper Ohio Basin in this report, except as noted, refer to that portion of the Basin lying within Pennsylvania.

The formations are principally shale and sandstone with some limestone. Within the Basin are found rich oil, gas and bituminous coal deposits of national importance.

(e) Cover:---See Reconnaissance Land Use Map (Fig. II) and Table I which indicates the proportion of various types of cover within the Basin.

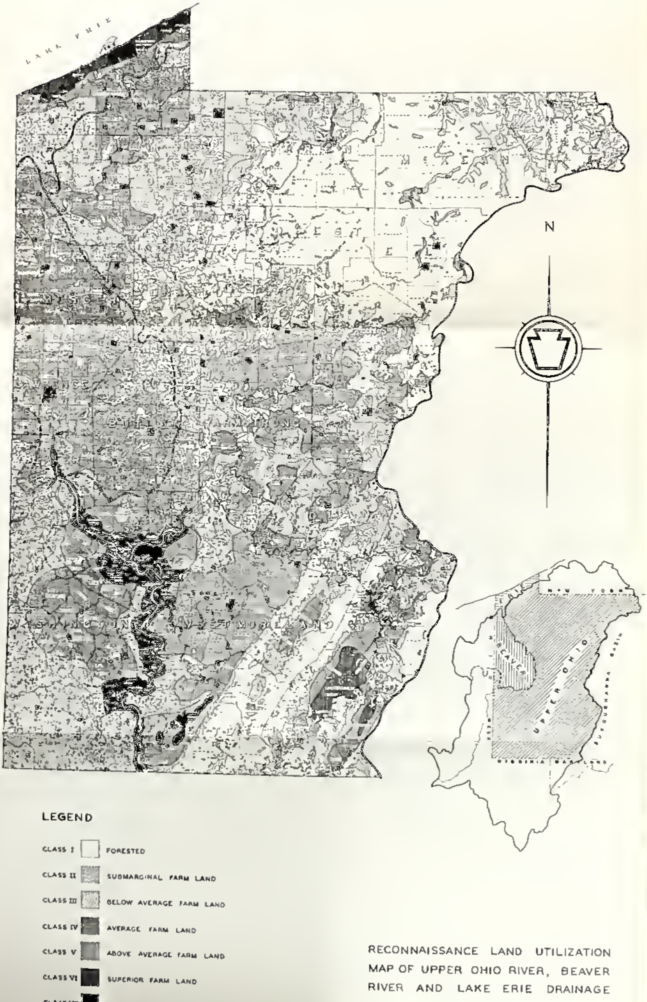
(f) Climate:---The Mean Annual Precipitation varies from 35 to 50 inches. Rainfalls in excess of 2.5 inches in 24 hours are comparatively rare. The average annual snowfall is 50 inches. The Mean Annual Temperature varies from 46° to 52°. Temperatures of 100° and higher have been recorded. There is an average of 15 days annually with temperatures of 90° and higher, and an average of 100 days or more with freezing temperatures. Temperatures of -20° are often recorded. Prevailing winds generally are from the west.

(g) General Relation to Adjoining Basins:---The Upper Ohio Basin is bounded on the North by the Erie and Genesee Basins, on the East by the Susquehanna Basin, and on the Northwest by the Beaver Basin. The State line cuts this Basin on the south and southwest and it extends in these directions into Ohio, West Virginia and Maryland.

# DRAINAGE BASIN STUDY

PENNSYLVANIA STATE PLANNING BOARD

1937




LEGEND

| | |
|---|---|
| CLASS I | FORESTED |
| CLASS II | SUBMARGINAL FARM LAND |
| CLASS III | BELOW AVERAGE FARM LAND |
| CLASS IV | AVERAGE FARM LAND |
| CLASS V | ABOVE AVERAGE FARM LAND |
| CLASS VI | SUPERIOR FARM LAND |
| CLASS VII | URBAN, SUBURBAN & INDUSTRIAL |

NOTE

INFORMATION FROM BASE MAP OF THE PENNSYLVANIA STATE COLLEGE SCHOOL OF AGRICULTURE AND EXPERIMENT STATION AS OF MAY, 1934

RECONNAISSANCE LAND UTILIZATION MAP OF UPPER OHIO RIVER, BEAVER RIVER AND LAKE ERIE DRAINAGE BASINS IN PENNSYLVANIA

SCALE

FIGURE II

TABLE I

APPROXIMATE FORESTED AND CLEARED LAND CLASSIFICATION BY WATERSHEDS

UPPER OHIO DRAINAGE BASIN IN PENNSYLVANIA

| WATERSHED | AREA IN ACRES | | | | TOTAL LAND | PERCENTAGE OF AREA | | | |
|---|---|---|---|---|---|---|---|---|---|
| | FORESTED | CLEARED | | | | FORESTED | CLEARED | | |
| | | NON-FARM | FARM | URBAN, R. R., HIGHWAY, ETC. | | | NON-FARM | FARM | OTHER |
| Conemaugh (above Johnstown) | 225,000 | 18,000 | 146,000 | 29,000 | 418,000 | 54 | 4 | 35 | 7 |
| Tionesta | 250,000 | 7,000 | 43,000 | 10,000 | 310,000 | 81 | 2 | 14 | 3 |
| Clarion | 527,000 | 38,000 | 187,000 | 36,000 | 788,000 | 67 | 5 | 24 | 4 |
| Balance Allegheny | 2,295,000 | 280,000 | 1,850,000 | 311,000 | 4,736,000 | 48 | 6 | 39 | 7 |
| Monongahela | 218,000 | 35,000 | 592,000 | 91,000 | 936,000 | 23 | 4 | 63 | 10 |
| Youghiogheny | 377,000 | 50,000 | 335,000 | 47,000 | 809,000 | 47 | 6 | 41 | 6 |
| Balance Ohio (below Pittsburgh) | 141,000 | 25,000 | 444,000 | 99,000 | 709,000 | 20 | 4 | 62 | 14 |
| TOTAL UPPER OHIO* | 4,033,000 | 453,000 | 3,597,000 | 623,000 | 8,706,000 | 46.4 | 5.2 | 41.3 | 7.1 |

* Excludes Beaver Watershed and area of water in the largest rivers. U. S. Census.

Note - Prepared from "County area data" in the files of the Department of Forest and Waters, assuming parts of counties in watershed have same proportion of each land class as the entire county.

## II HUMAN OCCUPANCY

In 1930, the Upper Ohio Basin had a population of 2,991,308 persons 3/. This comprised about 31 percent of the population of Pennsylvania and 2.4 percent of the population of the United States.

Figure III shows the distribution of population in Pennsylvania by drainage basins for the year 1930.

(a) Cities and Towns:---Information regarding the number, classification by population, size and rate of development, and general character of cities and towns of the Basin is given in Tables II and III.

(b) Rural Development:---

1. Agricultural 4/:---The northeastern portion of the Basin lies in the Allegheny Mountain part-time and self-sufficing farming area and is largely forested as shown by the Land Use Map (Fig. II). The northwestern portion lies in the Northwestern Dairy Region while the extreme northwest corner is in the Potter County Potato and Dairy Region. The southeastern and central portions of the Basin are in the Allegheny Plateau General Farming Region which constitutes the best agricultural lands in the Basin.

The region adjacent to Pittsburgh, which includes most of Allegheny County, is in the Pittsburgh Part-Time and Truck Farming Area. The Pittsburgh Dairy Region borders the Truck Farming Area on all but the northern side.

The southwest corner of the State is a specialized Fine

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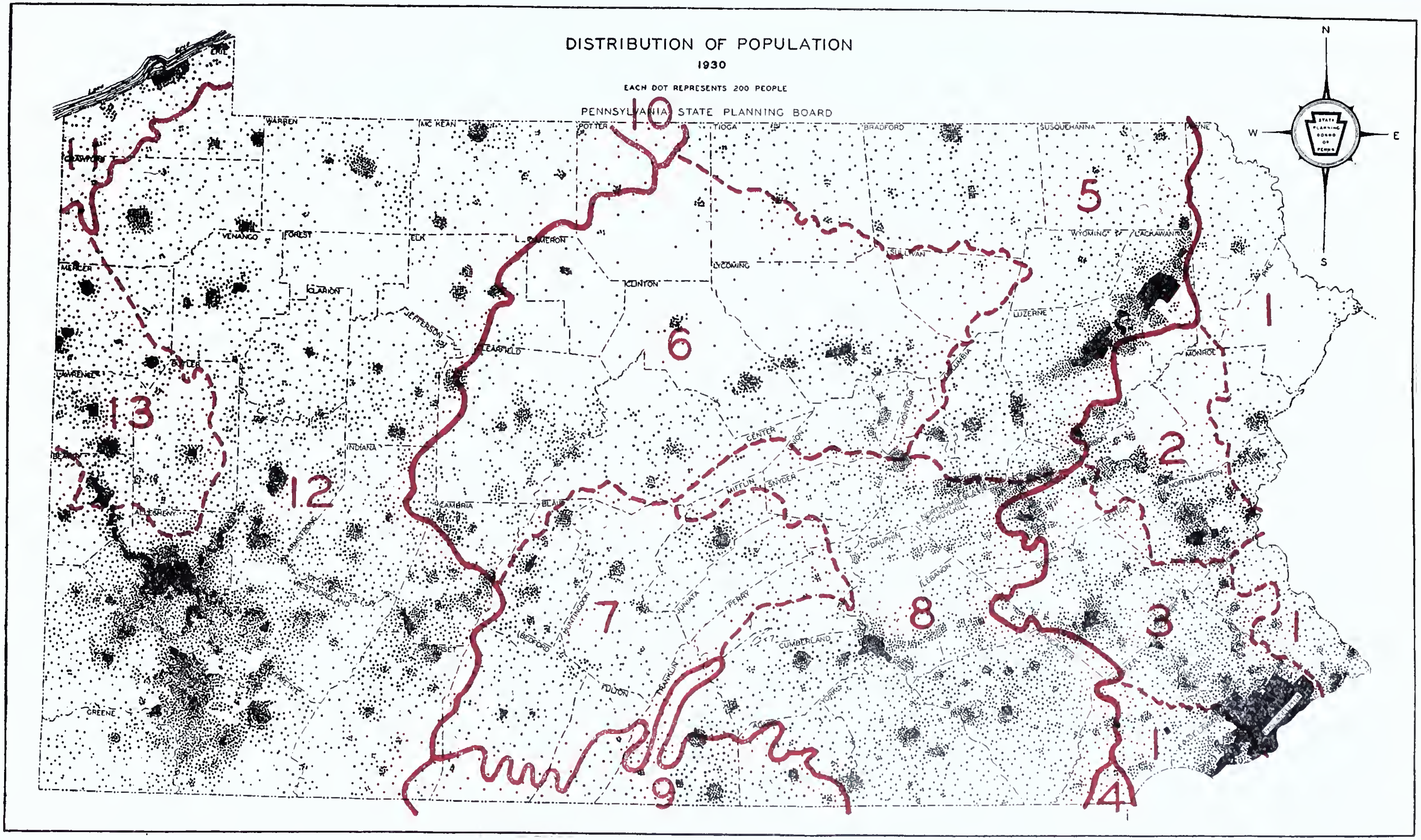
3/ Based on U.S. Census 1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each basin is estimated as proportional to area. Towns on the line are placed in one basin or the other.

4/ Preliminary Report Pennsylvania State Planning Board - Harrisburg, Pa., December 1934, page 106.




| DELAWARE BASIN | SUSQUEHANNA BASIN | 10. GENESEE BASIN |
|---|---|---|
| 1. DELAWARE | 5. NORTH BRANCH | 11. ERIE BASIN |
| 2. LEHIGH | 6. WEST BRANCH | OHIO BASIN |
| 3. SCHUYLKILL | 7. JUNIATA | 12. UPPER OHIO |
| 4. CHESAPEAKE BASIN | 8. LOWER SUSQUEHANNA | 13. BEAVER |
| | 9. POTOMAC BASIN | |

# DRAINAGE BASINS

SHOWN IN THEIR RELATION TO DISTRIBUTION OF POPULATION AS OF 1930

SEPTEMBER – 1937

FIGURE III

TABLE II

POPULATION CLASSIFICATION OF UPPER OHIO BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934** Population | ESTIMATED 1934** Per Cent of Total Basin | ESTIMATED 1934** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CITIES & BOROS | | | | | | | | | | | | | |
| 100,000 and Over | 1 | 467,570 | 26.6 | 669,817 | 22.4 | 27.4 | 643,505 | 21.3 | 26.4 | 202,247 | 43.3 | -26,312 | -4.1 |
| 50,000 - 100,000 | 2 | 70,170 | 4.1 | 121,625 | 4.1 | 5.0 | 115,355 | 3.8 | 4.7 | 51,455 | 73.3 | - 6,270 | -5.4 |
| 25,000 - 50,000 | 2 | 12,510 | .7 | 56,755 | 1.9 | 2.3 | 56,928 | 1.9 | 2.3 | 44,245 | 353.7 | 173 | .3 |
| 10,000 - 25,000 | 33 | 185,956 | 10.6 | 508,914 | 17.0 | 20.8 | 520,632 | 17.2 | 21.3 | 322,958 | 173.7 | 11,718 | 2.3 |
| 5,000 - 10,000 | 38 | 118,238 | 6.8 | 260,443 | 8.7 | 10.7 | 265,090 | 8.8 | 10.9 | 142,205 | 120.3 | 4,647 | 1.8 |
| 2,500 - 5,000 | 50 | 67,690 | 3.8 | 174,608 | 5.8 | 7.1 | 181,591 | 6.0 | 7.5 | 106,918 | 158.0 | 6,983 | 4.0 |
| Under - 2,500 | 223 | 91,217 | 5.2 | 195,125 | 6.5 | 8.0 | 198,812 | 6.7 | 8.3 | 104,908 | 114.1 | 3,687 | 1.9 |
| TOTAL CITIES & BOROS | 349 | 1,013,451 | 57.8 | 1,987,287 | 66.4 | 81.4 | 1,981,913 | 65.7 | 81.4 | 973,836 | 96.1 | -5,364 | -.3 |
| TOWNSHIPS | 461 | 737,339 | 42.2 | 1,004,021 | 33.6 | -- | 1,030,517 | 34.3 | -- | 266,682 | 36.2 | 26,496 | 2.6 |
| Unincorporated | | | | | | | | | | | | | |
| Villages | | | | *453,796 | 15.2 | 18.6 | 453,796 | 15.0 | 18.6 | -- | -- | -- | -- |
| Scattered | | | | 550,225 | 18.4 | -- | 576,721 | 19.3 | -- | -- | -- | 26,496 | 4.8 |
| TOTAL Population Residing in Communities | | -- | -- | 2,440,688 | 81.6 | 100.0 | 2,435,321 | 80.7 | 100.0 | -- | -- | -5,367 | -.2 |
| GRAND TOTAL UPPER OHIO SUB - BASIN | | 1,750,790 | 100.0 | 2,991,308 | 100.0 | -- | 3,012,430 | 100.0 | -- | 1,240,518 | 70.8 | 21,122 | .7 |

* 1934 Estimate by Rand-McNally & Co. (1900 Per Cent of Pennsylvania Population in Upper Ohio Sub-basin 27.8-of U.S. Population 2.3)

** Estimate by Penna. State Planning Board. (1930 Per Cent of Pennsylvania Population in Upper Ohio Sub-basin 31.1-of U.S. Population 2.4)

TABLE III

CLASSIFICATION OF CITIES AND BOROUGHS IN UPPER OHIO SUB-BASIN

| Cities and Boroughs | County | Population-1930 U.S. Census | Percent Increase 1900 -- 1930 | Predominant* Type of Industry |
|---|---|---|---|---|
| 100,000 and over (1) | | 669,817 | 43.3 | |
| Pittsburgh | Allegheny | 669,817 | 43.3 | A, T & M |
| 50,000 to 100,000 (2) | | 121,625 | 73.3 | |
| McKeesport | Allegheny | 54,632 | 59.6 | M |
| Johnstown | Cambria | 66,993 | 80.4 | T & M |
| 25,000 to 50,000 (2) | | 56,755 | 353.7 | |
| Wilkinsburg | Allegheny | 29,639 | 149.4 | M |
| Aliquippa | Beaver | 27,116 | 4,273.6 | T & M |
| 10,000 to 25,000 (33) | | 508,914 | 173.7 | |
| Bellevue | Allegheny | 10,252 | 200.0 | Sub. of Pgh. |
| Braddock | " | 19,329 | 23.5 | M |
| Carnegie | " | 12,497 | 70.5 | M |
| Clairton | " | 15,291 | -- | M |
| Coraopolis | " | 10,724 | 319.7 | M |
| Dormont | " | 13,190 | -- | Sub. of Pgh. |
| Duquesne | " | 21,396 | 136.8 | M |
| Homestead | " | 20,141 | 60.4 | M |
| McKees Rocks | " | 18,116 | 185.2 | T & M |
| Munhall | " | 12,995 | -- | M |
| North Braddock | " | 16,782 | 156.8 | M |
| Swissvale | " | 16,029 | 834.1 | M |
| Turtle Creek | " | 10,690 | 227.7 | M |
| Ambridge | Beaver | 20,227 | -- | T & M |
| Dubois | Clearfield | 11,595 | 23.7 | T & M |
| Meadville | Crawford | 16,698 | 54.3 | M |
| Connellsville | Fayette | 13,290 | 52.9 | T & M |
| Uniontown | Fayette | 19,544 | 166.1 | M |
| Bradford | McKean | 19,306 | 28.5 | M |
| Franklin | Venango | 10,254 | 40.1 | M |
| Oil City | Venango | 22,075 | 53.6 | T & M |
| Warren | Warren | 14,863 | 84.8 | M |
| Cannonsburg | Washington | 12,558 | 277.8 | M |
| Charleroi | " | 11,260 | 89.9 | M |
| Donora | " | 13,905 | -- | M |
| Washington | " | 24,545 | 87.9 | M |
| Arnold | Westmoreland | 10,575 | 641.6 | T & M |
| Greensburg | " | 16,508 | 81.1 | M |
| Jeannette | " | 15,126 | 157.9 | M |
| Latrobe | " | 10,644 | 130.7 | M |
| Monessen | " | 20,268 | 822.5 | M |
| New Kensington | " | 16,762 | 259.3 | T & M |
| Vandergrift | " | 11,479 | 188.0 | M |

TABLE III (Cont'd)

CLASSIFICATION OF CITIES AND BOROUGHS IN UPPER OHIO SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* Type of Industry |
|---|---|---|---|---|
| 5,000 to 10,000 (38) | | 260,443 | 120.3 | |
| Avalon | Allegheny | 5,940 | 178.9 | Sub. of Pgh. |
| Brackenridge | " | 6,250 | -- | M |
| Brentwood | " | 5,381 | -- | Sub. of Pgh. |
| Crafton | " | 7,004 | 263.5 | Sub. of Pgh. |
| East Pittsburgh | " | 6,214 | 115.5 | M |
| Etna | " | 7,493 | 39.2 | M |
| Glassport | " | 8,390 | -- | M |
| Millvale | " | 8,166 | 20.2 | M |
| Mt. Oliver | " | 7,071 | 208.1 | M |
| Oakmont | " | 6,027 | 159.4 | M |
| Pitcairn | " | 6,317 | 142.9 | M |
| Rankin | " | 7,956 | 110.8 | M |
| Sewickley | " | 5,599 | 56.9 | M |
| Sharpsburg | " | 8,642 | 26.3 | M |
| Tarentum | " | 9,551 | 74.5 | M |
| West View | " | 6,028 | -- | Sub. of Pgh. |
| Wilmerding | " | 6,291 | 50.5 | M |
| Ford City | Armstrong | 6,127 | 113.5 | M |
| Kittanning | " | 7,808 | 100.1 | M |
| Beaver | Beaver | 5,665 | 141.3 | M |
| Midland | " | 6,007 | -- | M |
| Monaca | " | 6,814 | 45.7 | M |
| Nanty Glo | Cambria | 5,598 | -- | (M) |
| Titusville | Crawford | 8,055 | 2.3 | A & M |
| Johnsonburg | Elk | 4,737 | 21.6 | M |
| Ridgeway | Elk | 6,313 | 79.6 | M |
| Corry | Erie | 7,152 | 33.2 | M |
| South Brownsville | Fayette | 5,314 | 194.4 | (M) |
| Blairsville | Indiana | 5,296 | 56.4 | T & M |
| Indiana | Indiana | 9,569 | 131.0 | M |
| Punxsutawney | Jefferson | 9,266 | 37.4 | T & M |
| Kane | McKean | 6,232 | 17.7 | M |
| Windber | Somerset | 9,205 | -- | T & M |
| Centerville | Washington | 6,467 | 766.9 | (M) |
| Monongahela | Washington | 8,675 | 67.7 | M |
| Mount Pleasant | Westmoreland | 5,869 | 23.7 | M |
| Parnassus (Oklahoma) | " | 6,240 | -- | (M) |
| Scottdale | " | 6,714 | 57.6 | M |

TABLE III (Cont'd)

CLASSIFICATION OF CITIES AND BOROUGHS IN UPPER OHIO SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* Type of Industry |
|---|---|---|---|---|
| 2,500 to 5,000 (50) | | 174,608 | 158.0 | |
| Aspinwall | Allegheny | 4,263 | 246.3 | M |
| Bridgeville | " | 3,939 | -- | M |
| Castle Shannon | " | 3,810 | -- | M |
| East McKeesport | " | 2,922 | 234.7 | Sub. of Pgh. |
| Edgewood | " | 4,821 | 323.3 | Sub. of Pgh. |
| Elizabeth | " | 2,939 | 57.5 | M |
| Emsworth | " | 2,709 | 182.8 | M |
| Forest Hills | " | 4,549 | -- | Sub. of Pgh. |
| Ingram | " | 3,866 | -- | M |
| Leetsdale | " | 2,774 | -- | M |
| Port Vue | " | 3,510 | 610.3 | M |
| Springdale | " | 4,781 | -- | M |
| Verona | " | 4,376 | 129.8 | M |
| Wall | " | 2,236 | -- | M |
| West Homestead | " | 3,552 | -- | M |
| Apollo | Armstrong | 3,406 | 16.5 | M |
| Freeport | " | 2,772 | 58.0 | (M) |
| Leechburg | " | 4,489 | 82.6 | (M) |
| Freedom | Beaver | 3,227 | 81.0 | M |
| Dale | Cambria | 3,364 | 123.8 | (M) |
| East Conemaugh | " | 4,979 | 128.9 | T |
| Ebensburg | " | 3,063 | 94.6 | (M) |
| Ferndale | " | 2,742 | 1,124.1 | M |
| Portage | " | 4,432 | 443.1 | M |
| South Fork | " | 3,227 | 22.5 | T & M |
| Westmont | " | 3,388 | 579.0 | (M) |
| Clarion | Clarion | 3,201 | 59.7 | M |
| Union City | Erie | 3,788 | 25.0 | A & M |
| Brownsville | Fayette | 2,869 | 84.9 | T & M |
| Masontown | " | 3,875 | 731.1 | M |
| South Connellsville | " | 2,516 | -- | M |
| Waynesburg | Greene | 4,915 | 93.2 | M |
| Clymer | Indiana | 2,672 | -- | M |
| Brockway | Jefferson | 2,690 | 51.4 | T & M |
| Brookville | Jefferson | 4,387 | 77.5 | T & M |
| Reynoldsville | " | 3,480 | 17.3 | M |
| Coudersport | Potter | 2,740 | -14.8 | M |
| Meyersdale | Somerset | 3,065 | 1.4 | M |
| Somerset | " | 4,395 | 139.6 | T & M |
| Polk | Venango | 3,337 | 221.8 | M |
| Bentleyville | Washington | 3,609 | 488.7 | M |
| McDonald | " | 3,281 | 9.5 | M |
| North Charleroi | " | 2,879 | 577.4 | M |
| Derry | Westmoreland | 3,046 | 29.8 | T & M |

TABLE III (Cont'd)

CLASSIFICATION OF CITIES AND BOROUGHS IN UPPER OHIO SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* Type of Industry |
|---|---|---|---|---|
| 2,500 to 5,000 (50) | | 174,608 | 158.0 | |
| Irwin | Westmoreland | 3,443 | 40.4 | M |
| North Bellevernon | " | 3,072 | 279.3 | (M) |
| South Greensburg | " | 2,520 | 260.0 | M |
| Southwest Greensburg | " | 3,105 | 273.6 | M |
| Trafford | " | 4,087 | -- | M |
| West Newton | " | 2,953 | 19.7 | (M) |
| Youngwood | " | 2,783 | -- | (M) |
| Under 2,500 Total (223) | | 195,125 | 114.1 | |
| Total Cities and Boros Upper Ohio Sub-Basin (349) | | 1,987,287 | 96.1 | |

* T - Transportation  M - Manufacturing  A - Agriculture  (M) - Mining

Wool Sheep District, while Fayette County in the south central portion is a Part-time and Self-sufficing Region.

The following table gives statistics pertaining to counties mainly within the Basin and shows trends in Agricultural Development. The trend has been downward from 1900 to 1930 but shows a decided reversal for the past 5 years. The farm population for the area involved was 236,782 in 1930. This increased to 288,943 in 1935.

TABLE IV

Number of Farms and the Amount of Land in Farms for Counties Located Mainly in the Upper Ohio Basin

| Year | No. of Farms | Land in Farms (Acres) | Percent of Total Area | Percent of Farm Land in Penna. |
|---|---|---|---|---|
| 1900 | 64,512 | 5,984,245 | 68.0 | 30.9 |
| 1910 | 62,352 | 5,587,477 | 63.5 | 30.1 |
| 1920 | 56,703 | 5,214,545 | 59.3 | 29.5 |
| 1925 | 57,525 | 4,865,565 | 55.3 | 29.9 |
| 1930 | 47,417 | 4,399,813 | 50.0 | 28.7 |
| 1935 | 56,347 | 4,715,354 | 53.6 | 29.7 |

Source:---Census of Agriculture -- U. S. Department of Commerce.

2. Industrial (decentralized):---The major decentralized industries of the Upper Ohio Basin include the production of coal, gas, oil, glass, clay-products, stone, sand and gravel.

3. Mining (including petroleum). --- Counties lying mainly in the Upper Ohio Basin contained 684 Bituminous Coal Mines and produced over 92 percent of the coal sold and produced in Pennsylvania in 1933. 5/. Statistics on this subject are given in the accompanying table.

TABLE V

BITUMINOUS MINING - OHIO BASIN

| | No. of Companies | No. of Operations | No. of Employees | Production Sold -- Tons | Percent of Total Production in State |
|---|---|---|---|---|---|
| Allegheny | 75 | 89 | 13,672 | 11,428,125 | |
| Armstrong | 29 | 37 | 3,729 | 2,434,874 | |
| Cambria | 93 | 126 | 17,177 | 11,747,281 | |
| Clarion | 19 | 22 | 1,609 | 1,120,502 | |
| Elk | 8 | 12 | 1,386 | 700,041 | |
| Fayette | 52 | 77 | 17,477 | 9,942,771 | |
| Greene | 11 | 12 | 3,333 | 2,321,802 | |
| Indiana | 42 | 58 | 6,558 | 4,972,909 | |
| Jefferson | 24 | 25 | 2,412 | 1,653,872 | |
| Somerset | 53 | 86 | 7,811 | 5,322,035 | |
| Venango | 2 | 2 | 23 | 8,990 | |
| Washington | 38 | 53 | 17,416 | 11,864,694 | |
| Westmoreland | 65 | 85 | 12,682 | 8,459,490 | |
| Totals | 511 | 684 | 105,285 | 71,977,386 | 92.8 |

These same counties contained 72,642 oil wells in 1931, which produced 11,184,132 barrels of petroleum 6/. This was over 94 percent of all the petroleum produced in Pennsylvania in that year.

5/ Report of Pennsylvania Department of Mines, 1933.
6/ Pennsylvania Productive Industries - 1931, Department of Internal Affairs. Harrisburg, Pennsylvania.

4. Lumbering:---The lumbering industry which reached its peak in Pennsylvania in 1900 has been declining since that time and is at present relatively unimportant in the State although it remains a potential industry for the future.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies under Sections (a) and (b)

1. Cities and Towns:---Study of Table II indicates the rapid growth of cities and boros in the Basin which nearly doubled in population between 1900 and 1930 and which as a whole showed a slight gain between 1930 and 1934. The tendency to draw together to form communities is indicated by the fact that in 1900 about half the Basin's population lived in boros and cities whereas in 1930 these places included 2/3 of the population. During the past five years the statistics indicate a limited "back to the land" movement. This is thought to be a temporary condition accountable to the depression causing a temporary interruption in the longer trend. Even though the "decentralization of industry" movement may continue to develop, it is believed that people will continue to dwell in communities where the benefits of group service and culture are more amenable to a highly developed civilization.

2. Agriculture:---Trends in agricultural development shown in Table IV indicate as would be expected the reverse of those showing development of cities and towns, - a dropping off in number of farms, and area of farm land. This is in line with improved agricultural production methods and the consequent decrease in needed acreage and manpower despite increasing production. The reversal in trend during the past 5 years is believed to be temporary and is probably accounted for by the fact that much land formerly abandoned as incapable of producing an adequate return

is now occupied by persons forced to leave the cities by depressed industrial conditions.

As may be seen on the Reconnaissance Land Utilization Map, (Fig. II), there are large areas of "below average" and "sub-marginal" farm land in the Upper Ohio Basin, especially in the northern and southern parts. The Pennsylvania State Planning Board is now engaged in a study of land use by means of which it hopes to determine which areas may be made more serviceable to the people of the State by withdrawing them from agricultural use. While this study has not yet progressed far enough to provide the limits of such areas it is believed that much of the land classified as "sub-marginal" and "below average" on the Land Utilization Map will fall in this category. It would appear that most of the land so withdrawn could best be utilized by being reforested.

Should such a program be carried out it is probable that the now decadent lumbering industry would be rejuvenated and perpetuated on a "sustained yield" basis.

3. Industry:---There has been a general downward trend in the production of bituminous coal in Pennsylvania since the end of the world war with an especially rapid decline since 1929. This has caused the abandonment of many marginal mines in the thinner beds with resulting aggravation of acid mine drainage.

The advent of by-product coking and the increased use of oil and gas as fuel together with decreased production and increased boiler efficiency have been largely responsible for this decline. 7/.

According to the State Geologist, the petroleum supply can be expected to last another 20 or 30 years after which time higher prices may revive the coal industry. This will not help the thin bedded mines, how-

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7/ Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pa. December 1934. Page 234.

ever, since they cannot be economically operated until thicker coal in other states has been mined out.

Pennsylvania has long been the steel producing center of the United States with the industry concentrated in Pittsburgh. This is largely due to the local coal supply, most of the ore being imported from Michigan and Minnesota. During recent years there has been a steady loss to the western production centers. One factor contributing to this shift has been the developments of by-product coking which has permitted economic operation at some distance from the coal supply. A factor which would possibly counteract this trend would be the resumption of mining of Pennsylvania ore as the higher grade western ores are exhausted. This is not to be expected for forty or fifty years.

(d) Transportation Facilities:---

1. Waterways:---See Section IV - a.

2. Highways:---The Basin is traversed in all directions by well paved highways connecting principal centers of population. There is on file with the Pennsylvania State Planning Board a map issued by the State Highway Department showing the highway system in detail.

3. Railways:---The Basin is traversed by various railroads including the Erie, New York Central, Bessemer and Lake Erie, Pennsylvania, Pittsburgh and Shamut, Baltimore and Ohio, and several minor roads. These connect the principal centers and mining areas, and the larger ones have terminal facilities at the docks of the inland waterways system. In general, the railroads follow the valleys. A map issued by the Pennsylvania Public Service Commission showing the railroad system in detail is on file with the Pennsylvania State Planning Board.

4. <u>Airports</u>:---There are 25 airports in the Upper Ohio Basin, and it is traversed by 4 major airlanes. Maps showing the location of the airports and airlanes are on file with the Pennsylvania State Planning Board. Descriptions of the airports are also available. 8/.

8/ Descriptions of Airports and Landing Fields in the United States - U. S. Department of Commerce, Airway Bulletin #2, September 1, 1934.

## III STREAMS OF THE BASIN 9/

### (a) OHIO RIVER — Main Stream

1. Source:---Formed by the junction of Allegheny and Monongahela rivers at Pittsburgh, Allegheny County; elevation 703.

2. Course:---Northwesterly into Beaver County to junction of Beaver River at Rochester; thence southwesterly, crossing State boundary near the junction of Little Beaver River, to Mississippi River at Cairo, Illinois.

3. Length:---Total 967 miles; in Pennsylvania, 39.4 miles along stream.

4. Drainage Area:---In Pennsylvania, 13,787 square miles.

5. Discharge:---Gaging Station at Sewickley, Pennsylvania. Drainage Area above station - 19,500 square miles.

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|---|---|
| Maximum Discharge March 18, 1936, | 29.4 c.s.m. |
| Minimum Discharge July 25, 1934 | 0.10 c.s.m. |

### (b) CHARTIERS CREEK — Tributary to Ohio River

1. Source:---In South Franklin Township, southern Washington County; elevation 1,300.

2. Course:---Northeasterly into Allegheny County to Ohio River at McKees Rocks, elevation 703.

3. Length:---52 miles along stream.

4. Drainage Area:---278.1 square miles of broken and hilly country; the valleys are eroded in ancient plateau, flanked with hills

9/ Source of this data for all streams except on discharge: Water Resources Inventory Report - Part III Gazetteer of Streams - Pennsylvania Water Supply Commission, Harrisburg, Pennsylvania, 1916.
Source of Discharge Data: Pennsylvania Department of Forests and Waters and U. S. Geological Survey, Harrisburg, Pennsylvania. Figures on Maximum Discharge on March 17 and 18, 1936, are advance unpublished data.

300 to 400 feet high; precipituous in places, especially along the lower course. The main valley is irregular and varies in width from narrow gorges to flats a mile wide. Geologic formations are clay and sandstone; coal, oil and gas are found.

5. Discharge:---No data available.

(c) RACCOON CREEK — Tributary to Ohio River

1. Source:---In Mount Pleasant Township, northern Washington County; elevation 1,230.

2. Course:---Northerly into Beaver County to Ohio River opposite Merrill; elevation 662.6.

3. Length:---45.0 miles along stream.

4. Drainage Area:---Contains 183.9 square miles of broken and hilly country; the main valley is hemmed in by steep hills, 300 to 400 feet high, and having broad flats along stream.

5. Discharge:---No data available.

(d) ALLEGHENY RIVER — Tributary to Ohio River

1. Source:---In Sweden Township, central Potter County.

2. Course:---Northwesterly through McKean County into New York, forming a loop 50 miles long before re-entering Pennsylvania in Warren County; thence southwesterly to join Monongahela River and form Ohio River at Pittsburgh; elevation 703.

3. Length:---314 miles along stream.

4. Drainage Area:---Total 11,705 square miles; in Pennsylvania 9,771 square miles.

5. Discharge:---Gaging Station at Franklin, Pennsylvania.

Drainage Area above Station 5,982 square miles.

Average Discharge, 16 years (1918-1934), 1.60 c.s.m.

Maximum Discharge, March 26, 1913 25.41 c.s.m.

Minimum Discharge, July 29, 1934 0.06 c.s.m.

(e) TIONESTA CREEK — Tributary to Allegheny River

1. Source:---In Watson Township, southern Warren County.

2. Course:---Northeasterly to Clarendon; thence southeasterly into Forest County to Lynch; thence southwesterly to Allegheny River at Tionesta.

3. Length:---58 miles along stream.

4. Drainage Area:---485.4 square miles of rough and hilly country with narrow valleys flanked with steep hills of shale and sandstone formations, containing some oil and gas.

5. Discharge:---Gaging Station at Nebraska, Pennsylvania.

Drainage Area above Station 481 square miles.

Maximum Discharge March 4, 1934 35.14 c.s.m.

Minimum Discharge Sept. 7-10, 1927 0.05 c.s.m.

(f) FRENCH CREEK — Tributary to Allegheny River

1. Source:---In Chautauqua County, southwestern New York; elevation 1,740.

2. Course:---Southwesterly, through Erie County, Pennsylvania, into Crawford County to Meadville; thence southeasterly through Mercer County, into Venango County to Allegheny River at Franklin; elevation 959.

3. Length:---In Pennsylvania, 78 miles along stream.

4. Drainage Area:---Total, 1,246.0 square miles; in Pennsylvania, 1,135.1 square miles of rolling agricultural country with broad valleys, containing many lakes and swamps of glacial origin; except for a small portion of lower end, the basin lies within the glaciated region. Shale and sandstone formations predominate, containing oil in lower basin. Drift deposited by melting ice of glacier has covered many parts of basin to considerable depths. The terminal moraine crosses the valley a short distance below Utica in a northeasterly-southwesterly direction.

5. Discharge:---Gaging Station at Saegerstown, Pennsylvania.

| | |
|---|---|
| Drainage Area above Station 629 square miles. | |
| Average Discharge, 13 years (1921-1934), | 1.65 c.s.m. |
| Maximum Discharge, January 20, 1929, | 27.03 c.s.m. |
| Minimum Discharge, August 26, 1934, | .04 c.s.m. |

(g) CLARION RIVER — Tributary to Allegheny River

1. Source:---The East branch is formed by junction of Instanter Creek and County Line Run, in Jones Township, northeastern Elk County. The main stream is formed by the junction of the east and west branches at Johnsonburg, Elk County.

2. Course:---Southwesterly into Clarion County, to Allegheny River near Parkers Landing; elevation 851.

3. Length:---East branch, 12 miles; main stream, 95 miles along stream.

4. Drainage Area:---1,231.6 square miles of shale and sandstone formations. Valuable deposits of oil and gas are found, principally in the lower basin, while the coal beds are more widely distributed.

5. Discharge:---Gaging Station near Piney, Pennsylvania.

Drainage Area above Station, 951 square miles.

| | |
|---|---|
| Average Discharge, 10 years (1924-1934), | 1.58 c.s.m. |
| Maximum Discharge, March 18, 1936, | 52.6 c.s.m. |
| Minimum Daily Discharge, (1933-1934), | .05 c.s.m. |

(h) REDBANK CREEK — Tributary to Allegheny River

1. Source:---Formed by junction of North Fork and Sandy Lick Creek at Brookville, Jefferson County.

2. Course:---Southwesterly to Allegheny River, at Redbank.

3. Length:---47.5 miles along stream.

4. Drainage Area:---585.5 square miles of broken and hilly country lying in the Allegheny Plateau. In the upper basin there is considerable flatland; in the lower basin the stream is in a narrow, steep-sided valley. Shale, sandstone and limestone formations predominate, containing coal deposits.

5. Discharge:---Gaging Station at St. Charles, Pennsylvania.

Drainage Area above Station, 528 square miles.

| | |
|---|---|
| Average Discharge, 21 years, | 1.66 c.s.m. |
| Maximum Discharge, March 18, 1936, | 66.7 c.s.m. |
| Minimum Discharge, August 9, 1910, | 0.02 c.s.m. |

(i) MAHONING CREEK — Tributary to Allegheny River

1. Source:---In Brady Township, northwestern Clearfield County.

2. Course:---Southwesterly, through Jefferson County, into Indiana County to the junction of Little Mahoning Creek; thence northwesterly into Armstrong County to Allegheny River at Mahoning.

3. Length:---74 miles along stream.

4. Drainage Area:---424.4 square miles. The upper basin lies in the uplands of the Allegheny Plateau and is slightly eroded, with elevations ranging from 2,200 to 2,500 feet. It is not mountainous, but slopes become abrupt and rugged forming deep valleys in the lower basin, the main valley being deep and in places broad, with steep wooded slopes, back of which are agricultural lands. There are good water storage sites. Shale and sandstone formations, containing rich coal deposits, gas and some limestone are found.

5. Discharge:---Gaging Station near Dayton.

Drainage Area above Station, 321 square miles.

| | |
|---|---|
| Average Discharge, 14 years (1920-1934), | 1.70 c.s.m. |
| Maximum Discharge, March 18, 1936, | 71.0 c.s.m. |
| Minimum Discharge, October 17, 1928, | 0.02 c.s.m. |

(j) CROOKED CREEK — Tributary to Allegheny River

1. Source:---In Rayne Township, central Indiana County; elevation 1,520.

2. Course:---Westerly, by a circuitous route, into Armstrong County; thence northwesterly to Allegheny River at Rosston; elevation 755.

3. Length:---58 miles along stream.

4. Drainage Area:---290.0 square miles of rolling country with round topped hills, abrupt slopes and deep, narrow stream valleys. Toward the head of the stream the rolling hills are less abrupt, and valleys wider and shallower. The main valley has wide flats and there are good sites for water storage. Shale, sandstone and limestone formations predominate, containing bituminous coal and gas.

5. Discharge:---Gaging Station near Ford City, Pennsylvania.

Drainage Area above Station, 280 square miles.

Average Discharge, 23 years (1910-13, 1914-34) 1.56 c.s.m.

Maximum Discharge, March 18, 1936, 75.0 c.s.m.

Minimum Discharge, September 11, 25, 26, 1932, 0.0035 c.s.m

(k) KISKIMINITAS RIVER (Including CONEMAUGH RIVER) Tributary to Allegheny River.

Introduction:---The Conemaugh River extends from Johnstown to Saltsburg; thence to Allegheny it is called Kiskiminitas River. In the following description the two streams are considered as one.

1. Source:---Formed by the junction of Little Conemaugh River and Stoney Creek at Johnstown, southwestern Cambria County; elevation 1,150.

2. Course:---Northwesterly to Allegheny River opposite Freeport; elevation 737.

3. Length:---Total 78 miles. Conemaugh River, 51 miles; Kiskiminitas River 27 miles along stream.

4. Drainage Area:---1,891.5 square miles; Conemaugh River, above Saltsburg, has a drainage area of 1,373.7 square miles. The topography varies from a high, gently rolling plateau at headwaters, the elevation ranging up to 2,800 feet, to a low dissected region less than 1,100 feet in elevation, marked by narrow, steep-sided valleys, and with high intervening ranges of mountains, through which some of the streams have cut narrow gorges. Shale and sandstone formations predominate, containing rich deposits of bituminous coal, and some gas and limestone.

5. Discharge:---Gaging Station at Avonmore, Pennsylvania.

Drainage Area above Station, 1723 square miles.

Average Discharge, 27 years (1907-1934), 1.73 c.s.m.

Maximum Discharge, March 18, 1936, 99.0 c.s.m.

Minimum Discharge during 1934 0.17 c.s.m.

(l) LOYALHANNA CREEK Tributary to Kiskiminitas River.

1. Source:---In Cook Township, southeastern Westmoreland County.

2. Course:---Northerly to Ligonier; thence northwesterly to Kiskiminitas River opposite Saltsburg; elevation 828.

3. Length:---49 miles along stream.

4. Drainage Area:---300.0 square miles, mountainous in headwaters with rolling hills in the lower basin. The main valley lies between Chestnut and Laurel ridges for 15 miles in the upper course, the stream cutting through Chestnut Ridge, forming a gorge, and continuing in rolling country to its mouth. Shale, sandstone and limestone formations, containing rich coal beds and some gas are found.

5. Discharge:---Gaging Station at New Alexandria, Pennsylvania.

Drainage Area above Station, 265 square miles.

Average Discharge, 11 years (1919-22, 1926-34), 1.65 c.s.m.

Maximum Discharge, March 18, 1936, 117.0 c.s.m.

Minimum Discharge, October 3, 1927, 0.009 c.s.m.

(m) MONONGAHELA RIVER Tributary to Ohio River.

1. Source:---Formed by the junction to Tygart Valley River and West Fork River, near Fairmont, West Virginia, elevation 858.

2. Course:---Northeasterly into Pennsylvania; thence northerly to join Allegheny River at Pittsburgh; elevation 703.

3. Length:---128.1 miles; in Pennsylvania, 91.6 along stream.

4. Drainage Area:---Total 7,340 square miles; in Pennsylvania 2,728 square miles. The basin lies west of the Allegheny Mountains and drains their slopes. From the eastern part, proceeding westward, the country becomes less mountainous and more fertile, consisting of rolling hills. The valleys in general are narrow with steep hillsides. The upland, close to the river, ranges in height above water from 500 to 600 feet along the upper reaches to about 400 feet in the vicinity of the mouth. From Fairmont to the Pennsylvania boundary the hills are close to the river, and only a few small areas of bottom land are found, but below that point there are a number of stretches, some of them bordering the river for several miles. Upon nearing Pittsburgh these flats become more extensive, in some cases having a width of about half a mile. The formations are principally shale and sandstone containing some limestone, oil, gas and rich coal beds. This basin holds one of the most valuable and extensively developed deposits of bituminous coal in the world.

5. Discharge:---Gaging Station at Charleroi, Pennsylvania.

Drainage Area above Station, 5,213 square miles.

| | |
|---|---|
| Average Discharge | No Record. |
| Maximum Discharge (est.) July 11, 1888, | 30.0 c.s.m. |
| Minimum Discharge 1933-34, September 16, 1934, | 0.08 c.s.m. |

(n) TENMILE CREEK — Tributary to Monongahela River.

1. Source:---In South Franklin Township, southern central Washington County; elevation 1,250.

2. Course:---Southeasterly to Monongahela River at Millsboro; elevation 747.1

3. Length:---34.5 square miles along stream.

4. Drainage Area:---338.2 square miles of hilly country. Main valley is wide and flat in places, flanked with steep hills, principally on south side of basin; through shale, sandstone and limestone formations. Coal, oil and gas are found in large quantities.

5. Discharge:---No data available.

(o) SOUTH FORK — Tributary to Tenmile Creek.

1. Source:---In Richhill Township, western Greene County; elevation 1,300.

2. Course:---Easterly to Waynesburg; thence northeasterly to Tenmile Creek at Clarksville; elevation 785.

3. Length:---34 miles along stream.

4. Drainage Area:---199.3 square miles of hilly country. The main valley in the upper course is narrow, flanked with steep hills, widening in the vicinity of Rogersville, Waynesburg and Jefferson.

5. Discharge:---Gaging Station on South Fork at Jefferson, Pa.

Drainage Area above Station, 180 square miles.

Maximum Discharge, March 14, 1936, 59.4 c.s.m.

Minimum Discharge (1931-34) Sept. 22-30, 1932, 0.005 c.s.m.

(p) REDSTONE CREEK — Tributary to Monongahela River.

1. Source:---On the western slope of Chestnut Ridge, in south Union Township, southern central Fayette County; elevation 1,280.

2. Course:---Northwesterly to Monongahela River at Brownsville; elevation 735.

3. Length:---26 miles along stream.

4. Drainage Area:---108.8 square miles. The basin is mountainous

at headwaters and hilly in the middle and lower sections; the main valley varies in width and is flanked with steep hills in the lower basin.

5. Discharge:---No data available.

(q) YOUGHIOGHENY RIVER Tributary to Monongahela River.

1. Source:---In Preston County, West Virginia, near Maryland-West Virginia boundary; elevation 2,900.

2. Course:---Northerly; through Maryland, into Pennsylvania to junction of Casselman River at Confluence; thence northwesterly to Monongahela River at McKeesport; elevation 715.2.

3. Length:---Total, 123 miles; in Pennsylvania, 83 miles along stream.

4. Drainage Area:---1,732.0 square miles; in Pennsylvania, 1,265.4 square miles. The greater part of the basin is rough and drains the western slopes of the Allegheny Mountains. Many of the small tributaries, particularly in the upper region, flow through deep, narrow, sparsely settled valleys, the slopes of which are generally wooded. The upper half of basin has five well defined mountain ranges, crossing in a northeasterly and southwesterly direction, through the generally broken surface of the region. Above Confluence the main stream flows parallel to the ridge structure, but below that place it breaks through nearly at right angles and enters more open country, which continues to the mouth. Formations are principally shale and sandstone, containing some limestone, oil and gas. There are valuable and extensively developed bituminous coal beds in the middle and lower portions of basin.

5. Discharge:---Gaging Station at Sutersville, Pennsylvania.

Drainage Area above Station, 1,715 square miles.

Average Discharge, 12 years (1920-29, 1931-34) 1.65 c.s.m.

Maximum Discharge, March 18, 1936, 64.2 c.s.m.

Minimum Discharge, July 10, 1918, Not determined.

(r) CASSELMAN RIVER Tributary to Youghiogheny River.

1. Source:--- Formed by junction of north and south branches in Garrett County, Maryland, 4 miles south of State boundary; elevation 2,225.

2. Course:--- Northeasterly, crossing State boundary at elevation 2,056, into Somerset County to Myersdale; thence northwesterly to Rockwood; thence southwesterly to Youghiogheny River at Confluence.

3. Length:--- In Pennsylvania, 42 miles along stream.

4. Drainage Area:--- Total, 576.0 square miles, in Pennsylvania, 479.6 square miles of mountainous and hilly country. The valleys are not wide and are flanked with steep hills which form gorges in many places. Shale and sandstone formations predominate, containing rich coal deposits.

5. Discharge:--- Gaging Station at Markleton, Pennsylvania.

Average Discharge, 14 years (1920-34) 1.57 c.s.m.

Maximum Discharge, March 29, 1924, Not determined.

Minimum Discharge, August 13, 1930, 0.03 c.s.m.

(s) INDIAN CREEK Tributary to Youghiogheny River.

1. Source:--- In Donegal Township, southeastern Westmoreland County.

2. Course:--- Southwesterly into Fayette County to Youghiogheny River at Indian Creek.

3. Length:--- 23 miles along stream.

4. Drainage Area:--- 125.7 square miles of mountainous country.

The main valley lies between mountain ridges, the upper reaches being open, hilly country; the lower valley becomes gorge-like for the last five miles.

5. Discharge:--- No data available.

(t) SEWICKLEY CREEK — Tributary to Youghiogheny River.

1. Source:--- In Unity Township, southern Westmoreland County.

2. Course:--- Westerly to Youghiogheny River at Gratztown; elevation 738.

3. Length:--- 32.5 miles along stream.

4. Drainage Area:--- 165.0 square miles of rolling hills. The main valley is wide with gently sloping hills; except for a 4 mile stretch in the lower course, where it is narrow and hemmed in with steep hills.

5. Discharge:--- No data available.

(u) TURTLE CREEK — Tributary to Monongahela River.

1. Source:--- In Franklin Township, northwestern Westmoreland County; elevation 1,160.

2. Course:--- Southwesterly to Trafford; thence westerly into Allegheny County to Monongahela River, at Port Perry; elevation 715.2.

3. Length:--- 19.5 miles along stream.

4. Drainage Area:--- 146.6 square miles of broken and hilly country, the upper basin contains rolling country beyond the steep hills along the stream; the valley in the lower basin narrows and is flanked with steep hills.

5. Discharge:--- Gaging Station at Trafford, Pennsylvania.

| | |
|---|---|
| Drainage Area above Station, 54.8 square miles. | |
| Average Discharge, 14 years (1920-34) | 1.43 c.s.m. |
| Maximum Discharge, March 15, 1933, | Not determined. |
| Minimum Discharge, (1914-34) Oct. 6-7,1922, | 0.002 c.s.m. |

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENT

(a) Navigation:-- The main stem of the Ohio River has been adequately improved for modern barge navigation with a minimum channel width of 300 feet and a depth of 9 feet. 10/

The Allegheny has been canalized from its mouth to Rimerton, Pennsylvania, a distance of 61 miles, by locks and dams, affording a navigable depth of from 7 to 10 feet. 10/

The Monongahela River has been improved for barge navigation throughout its length, about 128 miles, affording a navigable channel of from 7 to 11 feet. 10/

The Youghiogheny River has a 9 foot channel 200 feet wide for a distance of 1 mile above its mouth 11/and it has been dredged by private interests to provide navigation facilities for a distance of 9 miles above its mouth. 12/ On the Youghiogheny River the prevailing depth of channel is less than that of the Monongahela River, so that fully-loaded barges from Monongahela tows cannot be transported up the Youghiogheny River.

Surveys and studies have been made by Army Engineers pertaining to the extension of canalization upstream on the Allegheny River to Oil City, Pennsylvania. The Allegheny River-French Creek route is under consideration by the Army Engineers as one of two alternate routes for a canal connecting Lake Erie and the Ohio River.

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10/ Development of the Rivers of the U. S. House Document #395, 73 Congress, 2nd Session, Washington, 1934 - Pages 206, 209, 211, 213.

11/ Report of the Mississippi Valley Committee of the P.W.A., Washington, 1934, Page 155.

12/ Examination of Rivers and Harbors, Youghiogheny River, Pa. Report of the Corps of Engineers, U.S. Army, House Document #253, 69th Congress, 1st Session, 1925 - Pages 2 and 5.

Studies are also being made pertaining to the canalization of the Kiskiminitas River as far upstream as Johnstown, a distance of 75 miles.

The Adequacy of existing facilities is not known.

(b) Flood Control:-- Flood control in the Upper Ohio Basin is entirely inadequate.

1. Reservoirs and Detention Basins:-- None in Pennsylvania. Tygart Reservoir on the Tygart River near Grafton in West Virginia is under construction. This project comprises a gravity concrete dam with a maximum height of 240 feet. The spillway will be 207 feet above river bed. The capacity will be about 327,500 acre feet with a surface area of about 3,860 acres. The estimated cost of the project is $15,700,000. 13/ A project for the construction of 3 small detention reservoirs on Brush Run at Jeannette, Westmoreland County, Pennsylvania, was started as a work relief project. Although actual construction was begun at two of the sites, the dams have not been completed. The present status of the work is not known.

2. Levees:-- None of importance known.

3. Channel Improvements:-- The maintenance of a channel for navigation provides an incidental effect in reducing flood heights along the Ohio River and its navigable tributaries.

The Water and Power Resources Board of the Department of Forests and Waters has conducted studies and has prepared reports on channel improvement and it has established channel lines at the following places in the basin:--

1. Conemaugh River and Stoney Creek at Johnstown:-- Channel lines have been adopted by the City and while no flood control work has

13/ "Let us have Protection from Floods" - Tri-State Authority, Pittsburgh, Pa. 1935.

been done as such, about 10 percent of the encroachments have been removed to date by the relocation of private industries to conform to established channel lines.

2. French Creek at Meadville:-- Channel lines have been established but have not been adopted by city ordinance, so that the city is not obligated to assume damages to private property caused by channel improvements. None of the recommended improvements have been made.

3. Turtle Creek, Allegheny County:-- The old Water Supply Commission studied this stream in 1914 and prepared a report 14/ in which they recommended improvements to the channel and removal of encroachments. So far as is known none of the recommendations were carried out.

(c) Municipal, Domestic and Industrial Supplies:-- The yearbook of the Pennsylvania Department of Health, for 1934 (unpublished) tabulates information on public water works in Pennsylvania as of May 31, 1934, where water is treated.

Computations made on the basis of data from this report indicate that 2,183,365 persons or approximately 90 percent of the population (1934) of the Upper Ohio Basin residing in communities 15/ was served with treated water, either filtered, chlorinated, or both.

Complete data is not available concerning places having untreated supplies. It is known, however, on the basis of the report of the Pennsylvania Water Supply Commission (1916) and report of the Pennsylvania Topographic and Geologic Survey on "Ground Water in Northwestern Pennsyl-

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14/ Water Resources Inventory Report Part II - Water Supply Commission of Pennsylvania, Harrisburg, Pennsylvania, 1916.

15/ See Table II. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-McNally & Company.

vania", and "Ground Water in Southwestern Pennsylvania", that 46 communities in the Basin are served by untreated public supplies. The 1930 population of these places was 76,779 or about 3 percent of the Basin's community population. It is assumed that those places not listed as served by any of the supplies mentioned derive their supply from private wells and springs or possibly from industrial supplies.

A tabulation of all cities and boros in the Basin together with unincorporated places within Townships, having population of 500 or more, is contained in Appendix A. This tabulation lists for each community the status of water supply and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

1. Filtered Supplies:-- The Department of Health Report lists 94 communities in the Basin served by public water supply filtration plants. The population served comprises 1,629,355 people or about 67 percent of the population (1934) of the Basin residing in communities. 15/ Many of these supplies are chlorinated as well as filtered.

2. Chlorinated Supplies:-- The same report lists 109 communities in the Basin served by public water supplies without filtration plants, but equipped with chlorination plants. These serve 554,010 people or approximately 23 percent of the population (1934) residing in communities. 15/

3. Industrial Supplies:-- At the present time there is no State Department having jurisdiction over industrial water supplies and no complete up-to-date data concerning them are available. The Water Resources Inventory Report of the Water Supply Commission (1916) listed industrial supplies, but these data are considered obsolete.

In general, industries requiring water in quantity are located along the main streams of the Basin and derive their supplies from

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15/ See Table II. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-McNally & Company.

them. No information regarding the adequacy of these supplies is available.

In the past, during periods of low flow on the Monongahela there has been a shortage in industrial as well as domestic supply and the quality of the water has been unsatisfactory due to its high acidity. Control of low water flow by Tygart Reservoir is expected to help relieve this condition.

(d) Irrigation:-- None of importance known.

(e) Water Power:--

1. Mechanical:-- There are no mechanical plants in the basin developing 100 horsepower or over.

2. Hydro-Electric:-- There is only one existing Hydro-Electric Plant in the Upper Ohio Basin developing over 100 horsepower. This is the plant of the Clarion River Power Company, located at Piney on the Clarion River. It has an installed capacity of 34,000 horsepower at an average head of 75 feet.

(f) Drainage:-- None of importance known. Small areas in the northern part are drained for farm land by individual owners. A number of W. P. A. Drainage projects in the Basin are under way or are pending.

(g) Recreation and Wild Life:-- Counties mainly in the Basin (Allegheny, Armstrong, Cambria, Clarion, Crawford, Elk, Fayette, Forest, Greene, Indiana, Jefferson, McKean, Somerset, Venango, Warren, Washington, Westmoreland) now contain 268,819 acres of State owned land. Of this 92,492 acres is State Forest Land while the remaining 176,327 acres is owned by the Game Commission. The Allegheny National Forest in Elk, Forest, McKean and Warren Counties now comprises 383,929 acres 16/. This makes a total of 652,748 acres of Government owned forest land in the area.

16/ Service Letter, Pennsylvania Department of Forests and Waters, April 30, 1936.

In this same area are 32,822 acres of park and recreation land. This includes 6,863 acres of Municipally owned land and 11,259 acres of State owned land, the balance being privately owned; probably largely golf courses and the like 17/. This area of recreational land is considered inadequate and recommendations have been made 17/ for the future acquisition of an additional 29,503 acres of park and recreation land and 1,367,751 acres of Government owned forest land.

The Pennsylvania Fish Commission is conducting a program of stream improvement utilizing W. P. A. and C. C. C. labor for the smaller unpolluted streams where flood hazards to such development are not too great. In this Basin such programs are under way as W. P. A. projects in Armstrong, Cambria, Clarion, Crawford, Fayette, Forest, Indiana, Jefferson, McKean, Somerset and Warren Counties and C. C. C. workers are conducting the work in Elk, Fayette and Westmoreland Counties 18/.

The Fish Commission is also restocking unpolluted streams with game fish.

(h) Correlated Uses:-- The Tygart Reservoir referred to in section IV-b-1 of this report will be operated to serve multiple or correlated uses. It is proposed to operate the reservoir solely for flood control purposes by retention when flood stage is approached at the Pittsburgh gage and by prompt release of impounded water when the Monongahela River at Pittsburgh is below flood stage. Beginning in April storage would be allowed to accumulate up to 100,000 acre feet. This would be released

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17/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania, 1934, Pages 170-172.

18/ Map showing counties where stream improvement work has been approved - applications filed - November 15, 1935. Pennsylvania Board of Fish Commission, Harrisburg, Pennsylvania.

for maintenance of a regulated discharge of about 340 second feet at Lock No. 8 on Monongahela River. The reservoir would be practically emptied by December 15th. 19/

This low flow control primarily used as an aid to navigation by furnishing an adequate water supply, will also help to abate the pollution of the stream by dilution of sewage and by neutralization of acid (stored water is expected to be alkaline).

(i) Imported and Exported Water Supplies:- None of importance known.

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19/ "Let us have Protection from Floods" - Tri-State Authority, Pittsburgh, Pa., 1935

## V UNDERGROUND WATER 20/

(a) Extent of Areas and Supply:-- Ground water occurs in two types of openings - pore spaces and joints or crevices.

The geologic formations from which the majority of ground water supplies of the Upper Ohio Basin are derived, listed in order of their importance are:-

1. Alluvial deposits in southern portion, glacial out wash gravel in northern portion.
2. Sandstones.
3. Shales.
4. Unconsolidated limestones.
5. Coal.

There are maps available showing the distribution of these formations in the Basin as well as the location of wells, on which data is available, giving depth and descriptions of the water bearing materials 20/.

Ground water is generally available throughout the Basin and is extensively used as a source of domestic and industrial supply.

The mining of coal, however, has in many localities penetrated water bearing strata and drained them of their supplies.

(b) Character or Quality:-- The amounts of dissolved mineral matter in waters from different members of the various geologic formations in the Basin differ widely. The mineral constituents include all that are

20/ Information from "Ground Water in Northwestern Pennsylvania", by R.M. Leggette U. S. G. S. and "Ground Water in Southwestern Pennsylvania", by Arthur M. Piper, U.S.G S. Bulletins W-3 and W-1. Pennsylvania Geological Survey, Harrisburg, Pennsylvania, 1936.
The area covered by these reports is not contiguous with the Basin. The Counties referred to include Erie, Crawford, Mercer, Warren, Venango, Clairon, Armstrong, Forest, Jefferson, Indiana, Greene, Fayette, Somerset, Washington, Allegheny, Westmoreland and Butler.

found in normal waters in quantities sufficient to have any practical effect on the value of the waters for ordinary uses. The total hardness varies from 13 to 1,853 parts per million. In general the bicarbonate radicle exceeds the sulphate. The deeper waters in some localities are concentrated brines.

The most objectionable constituent found in the Basin's ground water is iron. Water containing more than 0.5 parts per million of iron becomes turbid when exposed to air, making filtration or other treatment necessary.

Data derived from the analysis of samples from individual wells throughout the area are available. 20/

(c) Economic Availability:-- The extent of present use would indicate that ground water is economically available for domestic and industrial water supplies in the Upper Ohio Basin.

(d) Extent of Use:-- The report of the Pennsylvania Department of Health for 1924 lists 55 communities, having waterworks serving 217,750 persons, which use springs, wells and cribs as a source of supply. The report also lists 15 communities which have waterworks serving 236,400 persons which use wells, springs and cribs as a partial source of supply.

According to the reports on "Ground Water in Northwestern Pennsylvania," and "Ground Water in Southwestern Pennsylvania," 46 additional communities are served water from wells and springs by municipal plants. These communities had an estimated population of 135,211 in 1934.

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20/ Information from "Ground Water in Northwestern Pennsylvania," by R. M. Leggette U.S.G.S., and "Ground Water in Southwestern Pennsylvania," by Arthur M. Piper, U.S.G.S. Bulletins W-3 and W-1. Pennsylvania Geological Survey, Harrisburg, Pennsylvania, 1936.

The area covered by these reports is not contiguous with the Basin. The Counties referred to include Erie, Crawford, Mercer, Warren, Venango, Clarion, Armstrong, Forest, Jefferson, Indiana, Greene, Fayette, Somerset, Washington, Allegheny, Westmoreland and Butler.

The population served ground water exclusively is estimated to be roughly 19 percent of the population residing in communities (1934). The population served part ground water and part river and creek water is estimated to be roughly 10 percent of the population residing in communities (1934). Many persons not residing in communities depend upon ground water derived from private wells and springs as a source of domestic supply.

(e) Prospective Uses:-- Since the temperature of ground water tends to be approximately that of the mean annual temperature of the atmosphere of the locality, it is particularly well adapted for industrial use as cooling water.

It would appear that ground water would continue to serve as a source for small domestic supplies since it requires little treatment and relatively inexpensive water works.

Ground water is particularly well suited for use in air-conditioning installations, and large quantities may be demanded for this purpose, especially during the summer months. The period of maximum demand for ground water for this purpose would, however, coincide with the period during which the ground water table is at the lowest level. 21/

21/ Remarks by Dr. George H. Ashley, State Geologist in conference on Drainage Basin Study with Mr. Weed. 6-9-36.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

The pollution of the streams of the Basin, especially in the Pittsburgh area, presents one of the most involved and important problems concerned with water use. The Monongahela, Youghiogheny and Kiskiminitas rivers are all acid and the Allegheny River has a very low alkalinity. The Clarion River is badly polluted in its upper reaches. 22/

For some years the Sanitary Water Board of the Pennsylvania Department of Health has conducted sanitary surveys of streams in Pennsylvania - "for the purpose of determining the locations where major pollutions originate and of measuring the ability of the streams to assimilate or recuperate from, by natural methods of purification, the effects of pollution". 23/ Such surveys have been conducted on the Allegheny, Ohio, Clarion and Kiskiminitas Rivers and on French Creek, but have not been made on the Youghiogheny or Monongahela Rivers, since the acidity of these streams would render the results meaningless. These surveys are discussed in detail in the paper referred to.

By a resolution adopted August 8, 1923 and amended April 23, 1929, the Sanitary Water Board provided for the classification of streams into three classes 23/ as follows:

CLASS "A"

Clean and relatively pure streams, e.g., generally fit for domestic water supply after chlorination, suitable for recreational purposes and which will support fish life.

(1) Streams in their natural state, unpolluted or uncontaminated from any artificial source but probably subject to chance contamination by human beings.

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22/ Based on discussion of subject by W. L. Stevenson, Chief Engineer Department of Health at a conference with Mr. Weed, May 15, 1936.

23/ "Sanitary Survey of Streams in Pennsylvania", a paper presented to Pennsylvania Water Works Operators' Assoc., June 25, 1930 - By C.L. Siebert, Exec., Engineer Sanitary Water Board - unpublished.

(2) Streams nearly in their natural state but subject to <u>minor artificial pollution</u> upstream which, through artificial purification of the polluting matter at the source or through natural purification of the stream, have again become clean and relatively pure streams, even during times of low stream flow.

<u>CLASS "B"</u>

Streams more or less polluted, where the extent of regulation, control, or elimination of pollution will be determined by a consideration of (a). The present and probable future use and condition of the stream (b). The practicability of remedial measures for abatement of pollution, and (c) The general interests of the public through the protection of the public health, the health of animals, fish and equatic life, and the use of the stream for recreational purposes.

<u>CLASS "C"</u>

Streams now so polluted that they cannot be used as sources of public water supplies, will not support fish life and are not used for recreational purposes and also from the standpoint of the public interests and practicability it is not now necessary, economical or advisable to attempt to restore them to a clean condition.

The policy of the board, as indicated by its resolutions relative to the maintenance and use of these three classes of streams was as follows:--

"RESOLVED, that all artificial pollution of Class "A" streams shall be prohibited and any sewage or industrial wastes on the watershed shall be treated to such a degree that the effluent shall be practically free from suspended matter, non-putrescent and disinfected and that recreational use shall not be sanctioned within prejudicial influence of waterworks' intakes, and further,

"RESOLVED, that the degree of treatment of sewage and industrial wastes discharged into Class "B" streams shall be determined for each particular stream or portion thereof after consideration of the general interests of the public and economies of the particular case, and further,

"RESOLVED, that sewage and industrial wastes may be discharged into Class "C" streams, provided however, that such discharge shall not create any public nuisance or menace to health."

The Sanitary Water Board has recently changed this policy of classifying streams. The board now believes that more effective results can be obtained by working for the abatement of pollution in all streams regardless of their former classification.

(a) Sewage:-- The Pennsylvania Department of Health submitted a report to the Pennsylvania State Planning Board in March 1935 which listed, in the Upper Ohio Basin, 19 communities having sewage treatment works. Mention was made of four other communities, sewage from which was treated at adjoining treatment works. The 1934 population of these 23 communities was 212,263 persons 24/ or about 9 percent of the Basin's community population.

The same report listed 186 communities having public sewers but no treatment works. These sewers emptied into streams or into sewers of adjoining communities, some of which may have treatment works. The four cases mentioned above, however, are the only ones where it is known that sewage so disposed of is treated. The total population of communities having public sewers was not necessarily served by them. This total population, however, in 1934 comprised 1,128,463 people or about 46 percent of the Basin's community population.

These figures do not include the city of Pittsburgh whose population in 1934 was estimated at 643,505 people. A very small part of this city's sewage is treated but most of it is discharged untreated into the Ohio River and its tributaries.

The report indicated that orders to install treatment works had been issued by the Department of Health to 15 of the sewered communities, having a combined population of 87,578 persons. These do not necessarily constitute all the places needing treatment since orders are issued only

24/ See Table II. This figure is made up of the population of incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-Mc-Nally & Company.

in connection with permits granted on application of a community to extend or reconstruct its sewers.

One place, Jeannette, is now constructing sewers and a sewage treatment works as P. W. A. project at a cost of $205,455.00.

Four other communities, Aspinwall, Monaca, Shaler Township and Delafield Heights are constructing sewers as P. W. A. projects at a cost of $543,331.00.

P. W. A. projects for sewers are pending for Fox Chapel and McKeesport, the estimated cost of which amounts to $194,160.00.

Including Pittsburgh and considering the above P. W. A. projects there is roughly 73 percent of the Basin's community population residing in communities at least partially sewered but having no treatment plants.

A tabulation of all cities and boros and unincorporated places (having a population of over 500) within townships in the Basin is contained in Appendix B.

This tabulation lists for each community the status of sewage disposal and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

It is evident from the above statistics that sewage contributes heavily to the pollution of streams in the Basin.

(b) Trade Wastes:-- The Sanitary Water Board of Pennsylvania has long campaigned for the proper disposal of industrial waste discharged into the streams of the State.

To quote its own statement 25/, "In the absence of more specific legal authority over trades' wastes the Board has secured the cooperation

25/ Yearbook of the Pennsylvania Department of Health 1930, Page 127.

of certain industries under cooperative agreements.......These include agreements with leather tanning, pulp and paper, by-product coke, manufactured gas and bituminous coal industries. Under these agreements the industry agrees to cooperate in developing suitable methods of waste disposal and meanwhile to utilize faithfully the best methods now known."

A description of these various agreements is contained in the Preliminary Report of the Pennsylvania State Planning Board page 228.

The Board has recently decided as in the case of the classification of streams that the pollution problem can be handled more effectively by dealing with offenders individually and in consequence all the agreements listed above except that with the by-product coke industry have been abrogated. The agreement with the pulp and paper industry has been partially abrogated.

(c) Oil Field and Mining Wastes:-- The acidity of some streams of the Basin constitutes a large factor in their pollution. This comes from four sources:

1. Operating Mines.
2. Abandoned Mines.
3. Industrial Wastes.
4. Gob Piles.

Under various "Emergency Programs", and currently under W.P.A., reduction of acid drainage has been attempted by "mine-sealing" projects under the direction of the Pennsylvania Department of Health. These provide for the air-sealing of abandoned mines to prevent the formation of acid by the oxidation of pyrites. Projects are being conducted in all counties where bituminous mines exist.

The State Department of Health, is now conducting a reconnaissance survey to obtain factual information pertaining to the number of abandoned mines, amount of acid drainage and the effects of the work accomplished. It is expected that this information will be available in the near future.

The work has been successful, to the extent prosecuted, and while it effects only one of the sources, is expected to produce noticeable results.

While the acidity of streams creates a difficulty from the standpoint of operation of waterworks and prevents the existence of fish life, its germicidal action helps to prevent a noticeable nuisance, in cases where untreated sewage is discharged into the streams, by its germicidal action. Although the oxidation of organic matter by aerobic bacteria is retarded, putrefaction by anaerobic bacteria is prevented by the acidity of the stream. A certain amount of coagulation of suspended solids occur, which are deposited on the stream bed.

(d) Silt and Erosion:-- Some of the most severe soil erosion conditions in the State are prevalent in the Upper Ohio Basin. The Soil Conservation Service has prepared an erosion map of the State 26/, which is on file with the Pennsylvania State Planning Board. According to this map, erosion in the northern third of the Basin is limited to rather small areas of "moderate sheet erosion". In the central and southern section, "moderate sheet erosion" with occasional gullies is wide spread. There are several large areas in Armstrong, Clarion, Indiana, Jefferson and

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26/ Reconnaissance Erosion Survey of Pennsylvania, May 1935, U. S. Dept. of Agriculture, Soil Conservation Service - Washington, D. C.

Westmoreland counties where "severe sheet erosion" with occasional gullies is found.

It would appear from this data that considerable silt would be carried by streams of the Basin, but in reference to this subject the Army Engineers have written 27/ - "Silting has not proved a serious problem in the past in the basin and it is not expected to arise in connection with any of the proposed improvements."

"Surveys of unwatered areas of Lake Lynn Reservoir on Cheat River and Quemahoning Reservoir on a tributary of the Conemaugh River show silt deposits 1 to 3 inches thick on relatively flat rock ledges. These deposits did not form a continuous cover. Lake Lynn has been in operation since 1925 and Quemahoning since 1910."

(e) Irrigation and Drainage:-- None of importance known.

27/ "The Ohio River" - Report of the Corps of Engineers, U. S. Army - House Document #306 - 74th Congress - 1st Session - pp. 178-179.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:--- The following quotations from current reports dealing with this subject furnish certain opinions as to the deficiencies and needs of navigation in the Upper Ohio Basin. "Studies have been made of a proposed navigation improvement of the Youghiogheny River, up to West Newton, Pennsylvania, a distance of 19.3 miles by means of two locks and dams. This project, which does not appear to be of immediate urgency, would cost about $4,860,000." 28/

"Studies have been made by the Army Engineers for the extension of navigation facilities on the Allegheny River from Rimerton to East Brady, a distance of 9 miles. This project was recommended by the Chief of Engineers on January 24, 1934." 29/

"Surveys and studies have been made looking to the extension of canalization (of the Allegheny River) upstream to Oil City, Pennsylvania, by the construction of 9 additional locks and dams at a total estimated cost of about $20,000,000. Surveys are now in progress to determine a route, and its feasibility, for a canal to connect Lake Erie with the Ohio River. One of the routes under consideration is by way of Allegheny River and French Creek, the mouth of the latter stream being well above the head of the present canalized reach." 28/

"Studies have also been made for the canalization of Kiskiminitas River, a tributary of the Allegheny, up to Apollo, 13.7 miles, and further studies are now under way for a similar improvement up to Johnstown, Pennsylvania, about 75 miles." 29/

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28/ "Development of the Rivers of the United States." H.D.#395, 73rd Cong. 2nd Session, Washington, D. C., 1934.
29/ "Report of the Mississippi Valley Committee, of P.W.A."

"Any impartial study of the inland waterways system of the Mississippi Basin inevitably leads to the conclusion that, irrespective of the present economic status of the separate projects comprising the system, and regardless of whether or not they were justified at the time they were built or improved, the time has now come when the whole question of inland waterway transportation should be restudied in its relation to a coordinated system of transportation for the whole country, in which railways, highways, waterways, and pipelines would all have their proper places and would be operated to the best advantage on a basis of generally uniform control." 30/.

The "308" reports of the Army Engineers which consider the navigation of streams mentioned above are not published or officially released. Much data on the subject is in the files of the District Engineer at Pittsburgh and may be reviewed there by permission of the Chief of Engineers.

In connection with the consideration of extending navigation facilities, the matter of their effect on the quality of the river water should be considered in relation to its use as a source of domestic supply.

In this connection it has been pointed out 31/ that navigation dams by decreasing stream velocities cause deposits of light flocculent material carried by the stream during low flow. This is scoured out when wickets are dropped, or during heavy flows, and the material is carried down-stream throwing a heavy load on water filtration plants. It has been suggested that the cause of pollution should be removed or at least controlled before more navigation dams are built in order that this situation be not aggravated.

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30/ "Inventory of Water Resources of the Mississippi River Drainage Area." National Resources Committee, Washington, D. C. - 1935.

31/ Conference between W. L. Stevenson, Chief Engineer, Pennsylvania Department of Health and F. H. Weed, Water Consultant - May 15, 1936.

Before additional navigation facilities are considered it would seem desirable to study the whole transportation situation in order to determine whether, in a properly coordinated system of all transportation facilities, such additional facilities are necessary or whether present facilities with minor extensions and improvements are adequate.

Proposed extensions to the present navigation system have been advocated on the basis of lower rates on bulk shipments rather than on the basis of inadequate transportation facilities.

If it is determined that the problem is one of rate differentials rather than adequacy of facilities then it might be desirable to consider means of rate regulation rather than extensive expenditures on waterway development.

(b) Flood Control:--This is the major need of the Upper Ohio Basin. Flood damages of substantial magnitude are frequently inflicted, notably in and around Pittsburgh.

In addition to Pittsburgh, the following municipalities are subject to serious flood damage:- Etna, Sharpsburg, Turtle Creek, Wilmerding, Ford City, Johnstown, DuBois, Meadville, Uniontown, Confluence, Oil City, Warren and Jeannette.

Many other cities and towns located along the streams are subject to damage of a minor nature.

No adequate protection from floods, by means of artificial features, exist in any municipality within the Basin.

"Flood protection for Pittsburgh and the Upper Ohio River, was studied under the direction of the Pittsburgh Flood Commission from 1908 to 1912. Between 1924 and 1929, U. S. Army Engineers studied the problem and develop-

ed much additional valuable data." 32/

"The possibilities of flood control in the (Ohio) valley have been investigated by many agencies and the investigations have indicated that the most favorable method involves the construction of a system of reservoirs. The suggested reservoir system also constitutes a very important part of the best flood-control plan for the Ohio River." 33/

Studies have been made by the Pennsylvania Water Resources Board for flood control at Johnstown and Meadville. These plans are now being rechecked by the Pennsylvania Department of Forests and Waters, and some alterations may be found desirable, in view of the information and data collected in connection with the flood of March 1936.

Agencies which have studied the flood control problem for the Basin seem to agree that the only practicable plan includes the construction of storage reservoirs, but some difference of opinion exists as to the best locations for some of the individual reservoirs. The solution can best be obtained by an examination of the topography and geology of the proposed sites, together with such surveys and test borings as are necessary to determine capacities and construction costs, and by the re-examination of existing data.

(c) Municipal, Domestic and Industrial Supplies:--- The following quotations from the report of the President's Committee on Water Flow 34/ give certain opinions regarding needs for water supply:

"Because of its comparative abundance, water supply is not a serious problem for any immediate or prospective use."

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32/ "Preliminary Report, Pennsylvania State Planning Board."
33/ "Development of Rivers of the United States."
34/ "The Development of Rivers of the United States." House Document #395, 73rd Congress, 2nd Session, Washington, D. C., 1934.

"There is always sufficient water for domestic consumption for those cities and towns that take their supply directly from the Ohio River, but the quality of the water has been impaired by pollution from sewage and trade wastes."

"The water supply furnished by this stream, (Monongahela River) particularly during certain seasons, generally in the summer and fall months, has long been recognized as insufficient to meet all of the needs."

This last quotation of course includes navigation as one of the needs. It is expected that this situation will be rectified at least in part upon the completion of Tygart Reservoir.

A large percentage of the Basin's community population is served with artificially purified river water from polluted streams. During periods of low flow the quality of the water is impaired and some difficulty is experienced in the operation of purification plants. Should the pollution of these streams increase to the extent that the quality of domestic supplies would be greatly impaired, it would become necessary either to secure water from other sources, or to rectify the pollution condition.

In the Preliminary Report of the State Planning Board the following statement was made:

"There is a rapidly growing demand on the part of the public for the use of relatively clean water as a source of supply rather than the serving of purified polluted raw water."

During recent floods many places depending on filtered water from main streams for a source of supply were without safe water for extended periods when their purification and pumping plants were flooded. On the other hand places served by upland supplies, fed by gravity were not affected by floods, but had an abundant supply of safe water for cleanup purposes as

well as for normal uses.

For these reasons it would seem desirable to consider for the future the development of upland supplies where they are economically feasible.

These sources where they involve the construction of reservoirs might also be used for limited recreational purposes.

In reference to present needs, the Pennsylvania Department of Health in a report to the Pennsylvania State Planning Board in March 1935, listed 41 communities in the Upper Ohio Basin having a population of 27,276 persons (1934 estimated population) now depending on private wells and springs as a source of supply, which it felt should have public water supplies.

The same report listed 51 communities having a population (1934) of 896,115 persons or about 36 percent of the Basin's community population already equipped with public water supplies but where improvements to the water works were needed.

These places are indicated in the tabulation of towns, Appendix A.

(d) Irrigation:---In the past, irrigation has not been considered necessary in Pennsylvania, and it is not considered an urgent need at present. The irrigation of crops at "critical periods" in climates where the average rainfall is adequate has been advocated. 35/ The possibility of water use for such irrigation might therefore be considered in the light of multiple use of water.

On this subject the Mississippi Valley Committee in its report states: 36/.

"Studies should be made of irrigation practice in ordinary humid regions of the East...where a supplementary water supply has been found use-

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35/ "Little Waters" - by H. S. Person, National Resources Committee, April 1936, Washington, D. C. - Page 60.

36/ "Report of the Mississippi Valley Committee of P.W.A.," Washington D.C. 1934. P. 7.

ful for producing certain crops on individual farms."

(e) Water Power:--- As indicated in section IV-c there is now only one hydro-electric plant in the Pennsylvania portion of the Upper Ohio Basin, although the existence of numerous potential power sites has been indicated in various reports dealing with the subject.

Several analyses indicate that under present conditions, steam plants are in general more economical to build and operate than hydro plants. So long as this is the case private interest will probably not be attracted to develop any of the potential sites for water power in the Basin unless the possibilities of any particular sites are exceptionally attractive.

The following quotations indicate the location of some of the sites and certain opinions on the matter:

"Of the 13 reservoirs proposed for flood control the nine on the Allegheny and Monongahela Rivers have been carefully studied by the Army Engineers as to their possibilities for combined use with water-power development, but so far such use has been found undesirable." 37/

"Potential water-power sites in the Allegheny Valley are confined entirely to its tributaries, the Clarion River having a potential aggregate capacity of 318,000 kilowatts; Brokenstraw and French Creek, 19,300 kilowatts; and Mahoning Creek 49,650 kilowatts." 38/

"Recent studies have disclosed many possibilities for hydro-development along this (Monongahela) River. Most of these, however, are beyond Pennsylvania's boundaries." 38/

Table VI contains a list of applications of water power companies, on

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37/ Report of the Mississippi Valley Committee.
38/ Preliminary Report Pennsylvania State Planning Board.

file with the Pennsylvania Water and Power Resources Board, none of which have been approved. None of these are being pushed by the applicants, however, and it is believed they simply desire to maintain prior claim to sites in case development in the future is found desirable.

In reference to the need for power, estimates prepared by the Federal Power Commission 39/ in March 1935, for Power District No. 7, which includes the large systems operating in western Pennsylvania, eastern Ohio, and northern West Virginia, indicate that with a resumption of pre-depression industrial activities there would be a deficit in generating capacity, after allowing for the minimum reserves necessary to assure adequate service, of 49,000 kilowatts. Additional reserves to take care of load growth, estimated as 10 per cent of the peak loads, would increase the deficit to 152,000 kilowatts or approximately 13.5 per cent of the present total dependable capacity, of 1,121,000 kilowatts.

The Federal Power Commission has informed the Pennsylvania State Planning Board that since their estimate was prepared, additions to generating capacity have been made in this area and additional installations are now contemplated by the utilities.

In discussing this subject the Mississippi Valley Committee states, "The Ohio Valley will probably double its demand for power in the next 20 years."

In view of the probable depletion of the thick coal beds and of oil and gas in this area within the next 30 years it would seem advisable in studying the economic feasibility of water power to give full consideration to prospective rising fuel prices.

Another factor which should be considered in studying the feasibility

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39/ Federal Power Commission-National Power Survey-Interim Report-Power Survey No. 1, Washington, D. C. 1935.

TABLE VI

Proposed Water Power Developments
As Indicated by applications received by
The Water and Power Resources Board

| Stream | Name of Applicant | Location of Dam | Capacity--H. P. |
|---|---|---|---|
| Clarion River | Clarion River Power Company | Near St. Petersburg | 190,000 H.P. |
| Clarion River | Clarion River Power Company | Near Mill Creek | |
| Richey Run | Emlenton Water Power Company | | 380 H.P. |
| Sugar Creek | Clinton Water Power Company | | 300 H.P. |
| Bear Creek | Parker Water Power Company | | 700 H.P. |
| Bear Creek | Parker Water Power Company | | 1,200 H.P. |
| Foube Run | Parker Water Power Company | | 160 H.P. |
| Mill Creek | Rockland Water Power Company | | 1,000 H.P. |
| Crooked Creek | Kittanning Water Power Company | Near Rosston | 20,000 H.P. |
| Gowan Shannock Creek | Kittanning Water Power Company | One mile above mouth | 8,000 H.P. |
| Youghiogheny River | Ohio Pyle Falls Development Company | Ohio Pyle | 9,600 H.P. |

Applications have been received for the incorporation of the following companies:-

Green Township Forest Water Power Company
Tionesta Water Power Company
Hickory Township Forest Water Power Company
Howe Township Forest Water Power Company
Kingsly Township Forest Water Power Company
Tionesta Township Forest Water Power Company
Sheffield Township Warren Water Power Company

Applications have been received for a development of Blackwater River, Big Sandy Creek and Cheat River by the West Virginia Power and Storage Company. Although the proposed power plants will be located in West Virginia, the reservoirs will in some cases extend into Pennsylvania. A total of 194,800 horse power of installed capacity was contemplated.

of water power is the fact that steam plants, now more economical, depend on non-placeable resources, coal and oil, for their energy, whereas now undeveloped water power resources are of a non-depletable variety.

On the other hand, coal and oil are vital necessities in the production of steel, gasoline, lubricating oils and other products and no substitutes for these resources are available at this time.

It would seem desirable, then, to consider the conservation of these resources for uses vitally dependent on them and to use water power as a substitute in the production of electrical energy.

This consideration would, of course, not be attractive to private interests, but should be interesting to public interests whose duties include the consideration of posterity.

(f) Drainage:---None of importance known.

(g) Recreation and Wild Life:---There is a very definite need for the development of water bodies in the Upper Ohio Basin since there are few natural lakes and ponds suitable for such use.

Swimming, boating and fishing are forms of recreation rapidly increasing in popularity. Provision for such facilities should be combined with water developments for other purposes wherever possible and in certain instances development primarily for recreational use is desirable.

Recreational use of water resources is extremely dependent on the abatement of pollution.

In its Preliminary Report the Pennsylvania State Planning Board says in this regard:--"The recreational use of the forest is an equal public service and shortly may be recognized as even a greater one than supplying raw wood materials where population is as dense as in Pennsylvania. A

specialized phase of the use of land for recreation must be recognized in hunting and fishing."

"It is good public policy to keep large areas of land in forests, for with no other profitable use these areas would soon deteriorate through erosion and injure adjacent agricultural lands as well as ruin our commercial waterways and waterworks of all kinds."

The Mississippi Valley Committee states in its report:--"The Allegheny and Monongahela Rivers above Pittsburgh drain the Allegheny Plateau, the clay loam soils of which erode easily if without cover. Ninety per cent of the forest area has major influence on stream-flow conditions......... About 100,000 acres are in need of planting,.........some 3,000,000 acres should be publicly owned."

The possibility of incorporating wild-fowl refuges with reservoirs used for flood control and power generation purposes should be considered, as well as the use of the surrounding areas for recreation and wild life purposes.

Reservoirs for domestic water supply combined with forest land for limited recreational purposes is another meritorious possibility in the consideration of multiple use of water.

In connection with the construction of large reservoirs it is considered desirable by authorities on wild life 40/ to build low water dams in the draws of the main reservoir in order to maintain pools for the propagation of fish, water-fowl and fur-bearing animals when the large reservoir is drawn down. Mr. O. M. Deibler, Commissioner, Pennsylvania Fish Commission, recommends a minimum water area of 5 acres for such pools.

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40/ Suggestion by Mr. Seth Gordon, Executive Secretary, Pennsylvania Game Commission, Conference on Drainage Basin Study with Mr. Weed. 7-3-36.

Recommendations contained in the Preliminary Report of the Pennsylvania State Planning Board call for the future acquisition of approximately 1,400,000 acres of forest, game and recreational land in the Upper Ohio Basin. (See section IV-g.)

(h) Rectification of Existing and Presentation of Future Contamination:--

"The problems of stream pollution by industrial wastes and domestic sewage are outstripping the best efforts of those whose function it is to effect an economical and rational balance between sensible regulation and industrial expansion..... In most States existing legal authority to limit the degree of water pollution must be exercised with rare judgment to prevent curtailment of industry which might produce undesirable social and economic consequences." 41/

There is a definite need for the abatement of pollution in the Upper Ohio Basin and this can be accomplished only by control or elimination of contamination at its sources.

Sewage constitutes a large portion of the pollution load in the Ohio River and its main tributaries. There is a very definite need for the construction of sewage treatment works by municipalities along these streams.

In regard to trade waste, Dr. W.L. Stevenson in a paper presented to the Chemical Engineering Congress of the World Power Conference, states: 42/.

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41/ Report on Water Pollution by the Special Advisory Committee of the National Resources Committee, Washington, D. C. - 1935 - Page 6.

42/ "The Treatment and Disposal of Industrial Wastes" by Dr. W.L. Stevenson. A paper presented to Chemical Engineering Congress of World Power Conference - London, England. June 22-27, 1936. Harrisburg, Pa. December 15, 1935. Page 15.

"Notwithstanding investigations so far made, the practicable treatment of some industrial wastes remains an unsolved problem and some are still in an experimental stage. For other industrial wastes, knowledge is now available based upon successful operation of full scale treatment works."

Included as an appendix to the paper quoted are descriptions of known processes for such treatment by recognized authorities.

There is a decided need for continued research to determine practical methods for the recovery of useful by-products from and for the adequate treatment of many trade wastes.

Such studies can be undertaken by only a few individual companies on account of the expense involved.

Research by competent technicians financed by trade associations or by public funds would seem to be the most practical means of gaining the knowledge necessary to make possible the abatement of such pollution.

Acid drainage from abandoned coal mines is being eliminated by the air-sealing of mines. The continuance of this program to include the sealing of all abandoned mines is desirable and will progressively eliminate this source of pollution.

No successful method of eliminating acid drainage from active mines has been developed and this matter should receive intensive study.

After practical means for treating wastes are developed the need will be to insure their actual use in preventing pollution.

The Pennsylvania Sanitary Water Board has long campaigned for the abatement of pollution and lacking strong supporting legislation it has worked largely on a cooperative basis, with considerable success.

The cooperative system of dealing with the situation if it can be effectively carried out would seem to be the most practicable since strin-

gent regulative legislation strongly exercised might produce undesirable social and economic complications.

On the other hand it is doubtful if the pollution problem can be completely solved without some form of legal authority to back up the regulating agency.

Unquestionably, the degree of treatment of trade wastes will vary with different streams and localities and consequently uniform regulation would hardly be practical.

There is much to be said, however, in favor of Federal or uniform State legislation, sufficiently flexible to allow intelligent application, but providing comparable regulation for the whole country, thus eliminating the possibility of industries in localities without pollution regulation furnishing disastrous competition for regulated industries elsewhere.

The Lonergan Water Pollution Bill (S. 3958-74th Congress, 2nd Session) under consideration in the last session of Congress proposed Federal legislation placing control of pollution of navigable streams and their tributaries in the hands of the National Resources Committee.

This bill was favored by the Pennsylvania Fish and Game Commissions and by Pennsylvania Deputy Attorney General, Grover Ladner, who has been active in its formulation and support.

BEAVER RIVER BASIN

(a) Length:---Maximum 78 miles.

(b) Breadth:---Maximum 39 miles.

(c) Area:--- 3,040.0 square miles; portion in Pennsylvania 1,784.3 square miles.

(d) Physiography:---The entire Basin 44/ lies within the Appalachian Plateau Region.

Topography:---Above New Castle the Basin lies in the glaciated region, containing broad valleys with many swamps and lakes. The main valley to Wampum is broad with wide flat bottom lands; thence to the mouth it is narrower and gorge-like with river terraces in many places and rolling hills beyond; the tributaries flow through deep ravines in the lower courses with rolling hills at their headwaters.

Geology:---The main Basin is traversed by the terminal moraine from northeast to southwest, crossing the main valley just above the junction of Connoquenessing Creek. Rich fire clay and sandstone deposits; some coal, iron ore, oil and gas are found in the Basin.

(e) Cover:---See Reconnaissance Land Use Map. (Figure II). Table VII shows the proportion of various types of cover in the Basin.

(f) Climate:---The mean annual precipitation varies from 35 to 50 inches. Rainfalls in excess of 2.5 inches in 24 hours are comparatively rare. The

43/ Source:-Paragraphs (a) and (b) :- Scaled from Stream Map of Pennsylvania-scale 6 miles = 1 inch. Paragraphs (c) and (d) Water Resources Inventory Report, Part III - Gazetteer of Streams - Pennsylvania Water Supply Commission, Harrisburg, Pennsylvania, 1916.

44/ Paragraph (f) Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934, page 71. Where mentioned hereafter the term "Beaver Basin" will refer to the portion in Pennsylvania.

average annual snow-fall is 50 inches. Mean annual temperature varies from 48° to 52°; temperatures of 100° and higher have been recorded. There are on an average 15 days annually with temperatures of 90° and higher; an average of 100 days or more have freezing temperatures, and temperatures of - 20° are often recorded. Prevailing winds generally are from the west.

(g) General Relation to Adjoining Basins:--- The Beaver Basin is bounded on the north by the Erie Basin, on the east and south by the Upper Ohio Basin, and on the west by the Ohio State line.

TABLE VII

APPROXIMATE FOREST AND CLEARED LAND CLASSIFICATION

BEAVER DRAINAGE SUB-BASIN

| CLASSIFICATION | AREA | PERCENTAGE |
|---|---|---|
| Forested | 281,000 acres | 24% |
| Cleared -- | | |
| Non-farm | 76,000 " | 7% |
| Farm | 700,000 " | 61% |
| Urban, R.R. - Highways: etc. | 85,000 " | 8% |
| Total Land | 1,142,000* acres | |

* Excludes area of water in the largest rivers. U. S. Census "Land Area."

Note: Prepared from "County Area" data in the files of the Department of Forests and Waters, assuming parts of counties in watershed have same proportion of each land class as the entire county.

## II HUMAN OCCUPANCY

In 1930 the Beaver Basin had a population of 325,462 persons. 45/ This comprised 3.4 per cent of the population of Pennsylvania, and about 0.3 per cent of that of the United States. The average density of population for the Basin was 182 per square mile.

Figure III shows the distribution of population in Pennsylvania by drainage basins for the year 1930.

(a) Cities and Towns:--- Information regarding the number, classification by population, size and rate of development, and general character of cities and towns of the Basin is given in Table VIII and IX.

(b) Rural Development:

1. Agricultural: 46/--- The western portion of the Basin lies in Pennsylvania's Northwestern Dairy Region while the eastern portion forms a part of the Allegheny Plateau General Farming Region. The Reconnaissance Land Use Map (Figure II) indicates that most of the land in the Basin is "average farm land" dotted with rather small forest areas. There are a few areas of "below average farm land" and most of these are located on high ground along the divide between the Beaver and Upper Ohio Basins.

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45/ Based on U. S. Census-1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each Basin is estimated as proportional to area. Towns on the line are placed in one Basin or the other.

46/ Preliminary Report Penna. State Planning Board - Harrisburg, Pa., Dec., 1934, Page 106.

## TABLE VIII

## POPULATION CLASSIFICATION OF BEAVER BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 | | U.S. CENSUS 1930 | | | ESTIMATED 1934, ** | | | Population Change 1900 -- 1930 | | Population Change 1930 -- 1934 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Population | Per Cent of Total Basin | Population | Per Cent of Total Basin | Per Cent of Community Pop. | Population | Per Cent of Total Basin | Per Cent of Community Pop. | Number | Per Cent | Number | Per Cent |
| CITIES & BOROS 25,000 to 50,000 | 2 | 37,260 | 19.0 | 74,582 | 22.9 | 31.1 | 72,141 | 21.8 | 29.6 | 37,322 | 100.2 | -2,441 | -3.4 |
| 10,000 to 25,000 | 4 | 23,910 | 12.2 | 67,392 | 20.7 | 28.1 | 71,123 | 21.5 | 29.1 | 43,487 | 181.9 | 3,726 | 5.5 |
| 5,000 to 10,000 | 5 | 20,890 | 10.7 | 37,654 | 11.6 | 15.7 | 38,647 | 11.7 | 15.8 | 16,764 | 80.2 | 993 | 2.6 |
| 2,500 to 5,000 | - | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Under - 2,500 | 37 | 16,821 | 8.6 | 29,937 | 9.2 | 12.5 | 31,940 | 9.7 | 13.1 | 13,116 | 78.0 | 2,003 | 6.7 |
| TOTAL CITIES & BOROS | 48 | 98,881 | 50.5 | 209,570 | 64.4 | 87.4 | 213,851 | 64.7 | 87.6 | 110,689 | 111.9 | 4,281 | 2.0 |
| TOWNSHIPS | 95 | 96,828 | 49.5 | 115,892 | 35.6 | -- | 116,630 | 35.3 | -- | 19,064 | 19.7 | 738 | .6 |
| Unincorporated Villages | | | | *30,267 | 9.3 | 12.6 | 30,267 | 9.2 | -- | -- | -- | -- | -- |
| Scattered | | | | 85,625 | 26.3 | -- | 86,363 | 26.1 | -- | -- | -- | 738 | .9 |
| TOTAL Population Residing in Communities | | -- | -- | 239,837 | 73.7 | 100.0 | 244,118 | 73.7 | 100.0 | -- | -- | 4,281 | 1.8 |
| GRAND TOTAL BEAVER SUB - BASIN | | 195,709 | 100.0 | 325,462 | 100.0 | -- | 330,481 | 100.0 | -- | 129,753 | 66.3 | 5,019 | 1.5 |

* 1934 Estimate by Rand McNally and Company.
** Estimate by Pennsylvania State Planning Board.

(1900 Per Cent of Pennsylvania Population in Beaver Sub-Basin 3.1-of U.S. Population .3)
(1930 Per Cent of Pennsylvania Population in Beaver Sub-Basin 3.4-of U.S. Population .3)

TABLE IX

CLASSIFICATION OF CITIES AND BOROUGHS IN BEAVER SUB-BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 25,000 to 50,000 (2) | | 74,582 | 100.2 | |
| New Castle | Lawrence | 48,674 | 71.8 | T & M |
| Sharon | Mercer | 25,908 | 190.6 | A & M |
| 10,000 to 25,000 (4) | | 67,397 | 176.2 | |
| Beaver Falls | Beaver | 17,147 | 56.7 | M |
| Butler | Butler | 23,568 | 117.2 | T & M |
| Ellwood City | Lawrence | 12,323 | 389.0 | M |
| Farrell | Mercer | 14,359 | non-existent 1900 | M |
| 5,000 to 10,000 (5) | | 37,654 | 80.2 | |
| New Brighton | Beaver | 9,950 | 45.9 | M |
| Rochester | Beaver | 7,726 | 86.3 | M |
| Greenville | Mercer | 8,628 | 79.2 | T & M |
| Grove City | Mercer | 6,156 | 285.0 | M |
| Sharpsville | Mercer | 5,194 | 74.9 | M |
| 2,500 to 5,000 | None | | | |
| Under 2,500 Total (37) | | 29,937 | 78.0 | |
| Total Cities and Boroughs Beaver Sub-Basin (48) | | 209,570 | 111.9 | |

* T - Transportation M - Manufacturing A - Agriculture (M) - Mining.

Table X contains statistics which are indicative of trends in agricultural development for this part of Pennsylvania. These trends have been downward from 1900 to 1930 but show a decided reversal from 1930 to 1935.

The farm population for the area involved was 48,152 in 1930. This increased to 53,807 in 1935.

TABLE X

NUMBER OF FARMS AND THE AMOUNT OF LAND IN FARMS FOR COUNTIES LOCATED MAINLY IN THE BEAVER BASIN

| Year | No. Farms | Land In Farms (Acres) | Per Cent Of Area | Per Cent Of Farm Land In Penna. |
|---|---|---|---|---|
| 1900 | 12,945 | 1,058,026 | 89.4 | 5.5 |
| 1910 | 12,485 | 996,137 | 84.1 | 5.4 |
| 1920 | 12,237 | 975,112 | 82.3 | 5.5 |
| 1925 | 11,337 | 862,875 | 72.9 | 5.3 |
| 1930 | 9,893 | 791,528 | 66.8 | 5.2 |
| 1935 | 11,467 | 866,259 | 73.2 | 5.5 |

Source: Census of Agriculture - U. S. Department of Commerce.

2. Industrial (decentralized):--- The major decentralized industries of the Beaver Basin include the production of bituminous coal, oil and gas, cement, glass clay, brick, pottery, stone, sand and gravel.

3. Mining (including petroleum):--- Counties mainly within the Basin contained 41 bituminous coal mines and produced about 1 million tons of bituminous coal in 1933. 47/ This comprised only 1.3 per cent of the total production for the State indicating that bituminous coal mining in the Basin is relatively unimportant compared to the Upper Ohio Basin.

These same counties namely, Beaver, Butler, Lawrence and Mercer produced 660,402 barrels of crude oil in 1931. 48 / This was approximately 5 per cent of the State's production.

4. Lumbering:--- This industry is of no importance in the Basin.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies under Sections (a) and (b):

1. Cities and Towns:--- Study of Table VIII indicates the rapid growth of cities and boros in the Basin which more than doubled in population between 1900 and 1930 and showed a continuing increase up to 1934. Township population has also increased but more slowly - less than 20 per cent in the 30 years from 1900 to 1930, which is accounted for in part by annexation of portions of townships to cities and boros.

No study of the future trends pertaining to rate of development of towns of the Basin has been made and such a study would involve the rather complicated situation surrounding shifts of industrial developments.

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47/ Report of Pennsylvania Department of Mines 1933. Harrisburg, Pa.
48/ Pennsylvania Productive Industries-1931, Department of Internal Affairs, Harrisburg, Pennsylvania.

2. Agriculture:--- The trend in agricultural statistics shown in Table X indicates a relatively small loss in number of farms from 1900 to 1935 compared with other parts of the State. The increase in number of farms and land in farms during the past 5 years has been greater than most parts of Pennsylvania and although the quality of land is not exceptional in this region it would appear that agriculture would continue as an important industry in the future. A small area along the divide at the eastern side of the Basin is indicated as below average on the Reconnaissance Land Use Map, and might possibly be withdrawn from agricultural use in the future.

3. Industry:--- The Beaver Basin contains one of the most important industrial areas of the United States 49/. It is made up largely of rather small manufacturing communities scattered along the main streams. The principal industry is the production of metal and metal products.

No study of future industrial development has been made, and it is therefore not possible to say what the future of industry in the Beaver Basin will be. In line with downward trend of the steel industry in the State 50/, however, and the passing of the developmental stage, the continued rapid growth of the section is not expected.

(d) Transportation Facilities.

1. Waterways:--- See Section IV a.

2. Highways:--- The Basin is traversed in all directions by well paved highways connecting the population centers.

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49/ Beaver, Shenango, Mahoning Rivers, Pa., and Ohio - Report of U. S. Army Corps of Eng. House Document No. 277 - 73rd Congress, 2nd Session, Washington, D.C., March 1934 - Page 29.

50/ Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pa. December 1934 - Page 270.

3. Railways:--- The Basin is traversed by various railways, including the Pennsylvania, New York Central, Bessemer and Lake Erie, Erie, and Baltimore and Ohio. These connect the principal centers and in general parallel the main streams.

4. Airports:--- There are 4 airports in the Beaver Basin and it is traversed by two major airlanes, Pittsburgh-Erie, and New York-Cleveland. Maps showing the location of airports and airlanes are on file with the Pennsylvania State Planning Board. Descriptions of the airports are also available 51/.

51/ Descriptions of Airports and Landing Fields in the United States - U. S. Department of Commerce, Washington, D.C. - Airway Bulletin #2, September 1, 1934.

## III STREAMS OF THE BASIN 52/

(a) BEAVER RIVER Main Stream

1. Source:--- Formed by junction of Mahoning and Shenango rivers, in central Lawrence County, 2.5 miles southwest of New Castle; elevation 763.

2. Course:--- Southeasterly into Beaver County to Ohio River at Rochester, elevation 668.3.

3. Length:--- 22.5 miles along stream.

4. Drainage Area:--- Total 3,040.0 square miles; portion in Pennsylvania, 1,784.3 square miles. The channel in upper course is 400 to 500 feet wide through clay and gravel to near Wampum, where it cuts through the terminal moraine and continues in middle and lower reaches through a deep gorge carved in sandstone. In places cliff banks rise 300 feet above river, while at other places broad river terraces are located between the stream and steep hills beyond.

Rate of fall per mile: from source to Hartman Dam at Beaver Falls, crest elevation 734.8, 17 miles, 1.7 feet; thence from base of dam, elevation 722.8 to mouth, 5.5 miles, 9.9 feet.

5. Discharge:--- Gaging Station at Wampum, Pennsylvania.

Drainage Area above Station, 2,235 square miles.

| | | | |
|---|---|---|---|
| Maximum Discharge | (1914, 1932-36) | March 25, 1936 | 19.02 c.s.m. |
| Minimum Discharge | (1914, 1932-34) | July 30, 1933 | 0.031 c.s.m. |

52/ Source for all streams except data on discharge - Water Resources Inventory Report part III Gazetteer of Streams. - Penna. Water Supply Comm. - Harrisburg, Pa. - 1916.
Source: Discharge Data: Penna. Dept. of Forests & Waters and U. S. Geological Survey-Harrisburg, Pa.

(b) MAHONING RIVER Tributary to Beaver River

1. Source:---In Columbiana County, Ohio.

2. Course:---Northerly, by a circuitous route, to Warren, Ohio; thence southeasterly, crossing State boundary at elevation 797, into Lawrence County to join Shenango River and form Beaver River at a point two and one-half miles southwest of New Castle; elevation 763.

3. Length:---In Pennsylvania, 12 miles along stream.

4. Drainage Area:---Total 1,099.4 square miles; portion in Pennsylvania, 54.6 square miles of rolling hills and broad valley in glaciated region. Rate of fall, from State boundary to mouth, 2.8 feet per mile.

5. Discharge:---No record.

(c) SHENANGO RIVER Tributary to Beaver River

1. Source:---In East Fallowfield Township, southwestern Crawford County; elevation 1,050.

2. Course:---Northwesterly to a point 3 miles west of Linesville; thence southerly, through Mercer County, into Lawrence County, to join Mahoning River and form Beaver River, at a point two and one-half miles southwest of New Castle; elevation 763.

3. Length:---87.5 miles along stream.

4. Drainage Area:---Total, 1,080.0 square miles; portion in Pennsylvania, 793.0 square miles of rolling hills and broad valleys within the glac-

iated area, containing many swamps and lakes. The main Valley is flanked with steep hills at "Big Bend" and a few other points, but is generally broad and flat between gently sloping sides.

Surface formations are clay and gravel with boulders from glacial action and moraine deposit; sandstone beneath, out-cropping in stream valleys of lower courses and tributaries; some oil, gas and coal.

5. Discharge:---Gaging Station at New Castle, Pennsylvania.

Drainage Area above Station, 792 square miles.

| | |
|---|---|
| Average Discharge, 24 years (1910-1934) | 1.11 c.s.m. |
| Maximum Discharge, (March 26, 1913) | 50.25 c.s.m. |
| Minimum Discharge, (August 14, 1930) | 0.0076 c.s.m. |

(d) PYMATUNING CREEK — Tributary to Shenango River

1. Source:---In Ashtabula County, Ohio. 4 miles northwest of Andover; elevation 1,100.

2. Course:---Southeasterly, crossing State boundary at elevation 891, into Mercer County to Shenango River two miles northeast of Sharpsville, elevation 870.

3. Length:---In Pennsylvania, 6 miles along stream.

4. Drainage Area:---Total, 176.4 square miles; portion in Pennsylvania, 25.2 square miles of flat, rolling hills. The channel is tortuous, through swamps and glacial drift. Rate of fall, from State boundary to mouth, 3.5 feet per mile.

5. <u>Discharge</u>:---Gaging Station at Orangeville, Pennsylvania.

Drainage Area above station, 169 square miles.

| | |
|---|---|
| Average Discharge, 16 years (1914-22, 1926-34) | 1.23 c.s.m. |
| Maximum Discharge, (March 25, 1936) | 19.23 c.s.m. |
| Minimum Discharge, (September 25, 1933) | 0.003 c.s.m. |

(e) <u>NESHANNOCK CREEK</u> <u>Tributary to Shenango River</u>

1. <u>Source</u>:---Formed by junction of Otter Creek and Cool Spring Creek, at Mercer, southern Mercer County; elevation 1,085.

2. <u>Course</u>:---Southwesterly into Lawrence County to Shenango River at New Castle; elevation 785.

3. <u>Length</u>:---24.5 miles along stream.

4. <u>Drainage Area</u>:---244.5 square miles of rolling hills and wide valley in upper Basin; gradually narrowing valleys with steeper slopes from above Volant to Neshannock Falls, being gorge-like in places. The lower Basin is hilly with a wide valley. Formations are shale and sandstone, containing coal. The channel is winding, through glacial drift and swamps in upper course; rough and steep in middle and lower courses. Rate of fall per mile; from source to Volant, elevation 1,000, 10.5 miles, 8.1 feet; thence to mouth, 14 miles, 15.4 feet.

5. <u>Discharge</u>:--- No record.

(f) CONNOQUENESSING CREEK                Tributary to Beaver River

1. Source:---In Concord Township, northern central Butler County; elevation 1,300.

2. Course:---Southwesterly to Renfew; thence westerly into Beaver County; thence northwesterly into Lawrence County to Beaver River one mile west of Ellwood City.

3. Length:---59 miles along stream.

4. Drainage Area:---832.7 square miles of broken and hilly country, lying in western plateau region and largely outside of the glaciated area. The main and tributary valleys vary from narrow and steep gorges to broad and flat lowlands. The main valley is flanked with steep hills 200 to 400 feet high. From Butler to Harmony the valley is relatively narrow; thence to Frisco, there are broad, rich agricultural bottom lands. The Creek is in a gorge for the lower 6 miles of its course. Principally sandstone and shale formations are found, containing oil, gas and some coal. Rate of fall, from elevation 1,100 to junction of Slippery Rock Creek, elevation 817, 51 miles, 5.5 feet per mile.

5. Discharge:---Gaging Station at Hazen, Pennsylvania.

Drainage Area above Station, 356 square miles.

| | |
|---|---|
| Average Discharge, 15 years (1919-34) | 1.34 c.s.m. |
| Maximum Discharge, (June 29, 1924) | Not determined. |
| Minimum Discharge, (September 12, 1932) | 0.019 c.s.m. |

1. Source:---In Venango Township, northern Butler County; elevation 1,480.

2. Course:---Southwesterly into Lawrence County to Connoquenessing Creek, one mile east of Ellwood City; elevation 817.

3. Length:---47 miles along stream.

4. Drainage Area:---403.8 square miles. Broad valleys with gentle slopes, above Kennedy Mills. Lowlands contain many swamps and a few lakes of glacial origin. Below Kennedy Mill, the main valley is narrow with massive sandstone blocks covering the high, precipitous banks; the tributaries are small, cutting deep ravines and in places plunging over precipitous banks of main stream. Formations are principally sandstone. Oil, gas, and some coal and limestone are found. From source to Kennedy Mill, the channel meanders through clay, gravel and boulders, in places being sluggish and broadening into swamps. Below Kennedy Mill the channel is through a deep gorge eroded in huge sandstone boulders of the terminal moraine. Rate of fall per mile, from elevation 1,200 to 1,000, 32 miles, 6.2 feet; thence to elevation 900, 3 miles, 33.3 feet; thence to mouth, 7.5 miles, 11.1 feet.

5. Discharge:---Gaging Station at Wurtemburg, Pennsylvania.

Drainage Area above Station, 406 square miles.

| | |
|---|---|
| Average Discharge, 21 years (1912-32, 1933-34) | 1.35 c.s.m. |
| Maximum Discharge, (December 14, 1927) | Not determined |
| Minimum Discharge, (September 8, 1925) | 0.027 c.s.m. |

(h) <u>BEAVER (LITTLE) RIVER (INCLUDING NORTH FORK)</u>

<u>Tributary to Beaver River</u>

1. <u>Source</u>:---The North Fork rises in Mahoning County, Ohio; elevation 1,180. The main stream is formed by the junction of Middle Fork and West Fork, in Columbiana County, Ohio.

2. <u>Course</u>:---North Fork: southeasterly, crossing State boundary at elevation 993, through Lawrence County into Beaver County; thence southwesterly, crossing State boundary at elevation 830, into Ohio to Little Beaver River. Main stream: southeasterly into Beaver County, Pennsylvania, to Ohio River at Smiths Ferry, near Pennsylvania-Ohio boundary; elevation 655.7.

3. <u>Length</u>:---North Fork, in Pennsylvania 21 miles. Main stream, from St. Clair, Ohio, to mouth, 7.5 miles.

4. <u>Drainage Area</u>:---Total, 494.6 square miles; portion in Pennsylvania, 102.0 square miles. The country is composed of rolling hills and broad valleys above Darlington. The terminal moraine traverses the Basin at Darlington from east to west; thence to the mouth, the broad valley narrows and is hemmed in with steep hills 400 to 500 feet high. The main Little Beaver River continues thence to its mouth in a gorge-like valley with rolling hills beyond.

The channel is sinuous, through clay and gravel in upper course; through the terminal moraine in middle course, and carved deeply in sandstone in lower course. Rate of fall per mile, North Fork, in Pennsylvania, 7.8 feet. Main stream, from St. Clair, Ohio, to mouth, 10.6 feet.

5. <u>Discharge</u>:---No record.

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENT

(a) Navigation:---The streams of the Basin are not developed for modern navigation.

The Basin was once traversed by a system of barge canals extending up the Beaver from the Ohio River via the Mahoning to the Ohio State line and via the Shenango, and other streams to Lake Erie at Erie. These canals were abandoned about 1870 and there is now little trace of their existence.

It is claimed by local interests that transportation cost on the enormous tonnage of imported raw materials and exported finished products has placed this area under a serious handicap in competing with other districts which are favored with water transportation. They have long attempted to promote the improvement of streams of the Basin for navigation in order to obtain, as they claim, some measure of parity in the competitive markets of the country. 53/

(b) Flood Control:---While the flood problem has not been as acute in the Beaver Basin as in the Upper Ohio it is nevertheless a definite one and existing provisions for control are inadequate. Damages in the valley due to the 1913 flood amounted to $2,100,000. 54/

1. Reservoirs and Detention Basin:---Pymatuning Dam at the headwaters of the Shenango River was recently completed by the Pennsylvania Department of Forests and Waters. This reservoir has a drainage area

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53/ Beaver Shenango, Rivers, Pa. & Ohio - Report of U. S. Army Corps of Engineers. House Document No. 277-73rd Congress, 2nd Session, Washington, D. C., March 1934, Page 133.

54/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pa. December 1934, Page 197.

of 160 square miles and a capacity of 64,275,000,000 gallons. 55/

While this reservoir has been effective as a flood control measure it does not adequately protect the Basin against floods.

2. Levees:---There are no levees of importance in the Basin.

3. Channel Improvements:---None of importance. The Water and Power Resources Board of the Pennsylvania Department of Forests and Waters has conducted studies for channel improvement and has established channel lines at the following places.

1. Connoquenessing Creek and Sullivan Run in the city of Butler. (1930) Estimated cost of development $1,080,000. Channel lines have been laid out, but have never been adopted by the city through ordinances. None of the recommended improvements has been made.

2. Shenango River in the city of New Castle. (July 1930). No estimate of cost was made. Channel lines were laid out and monumented but they have never been adopted by the city through ordinances. None of the recommended improvements has been made.

3. Shenango River in the city of Sharon. (March 1933). No estimate of cost was made. Channel lines have been established but have not been adopted by the city throgh ordinances. None of the recommended improvements has been made.

The significance of the failure of cities to adopt channel lines is that they are not obligated to assume damages to private property caused by channel improvements.

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55/ Ibid. - Page 212.

The State Water and Power Resources Board, however, is authorized by law 56/ to establish channel lines and to control by permit the encroachment of new construction. This law has been in effect since 1913.

(c) Municipal, Domestic and Industrial Supplies:---The yearbook of the Pennsylvania Department of Health for 1934 (unpublished) tabulates information on public waterworks in Pennsylvania where water is treated as of May 31, 1934.

Computations made on the basis of data from this report indicate that 214,732 persons or approximately 88 per cent of the population (1934) of the Beaver Basin residing in communities 57/ were served with treated water, either filtered, chlorinated or both.

Complete data are not available concerning places having untreated supplies. It is known, however, on the basis of the report of the Pennsylvania Water Supply Commission (1916) and Report of the Pennsylvania Geological Survey on "Groundwater in Northwestern Pennsylvania" that a number of communities in the Basin have untreated public supplies. It is assumed that those not so served derive their supply from private wells and springs or from industrial supplies.

Appendix A contains a tabulation of all cities and boros and unincorporated places (having a population of over 500) within townships in the Basin. This tabulation lists for each community the status of water supply and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

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56/Form FWWR-23, Pamphlet issued by Pennsylvania Department of Forests and Waters. Water and Power Resources Board, Harrisburg, Pa., 1936, page 3.

57/See Table VIII. This figure is made up of the Population of Incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the Population of Unincorporated places in 1934 as reported by Rand McNally and Company.

1. Filtered Supplies:---The Department of Health Report lists 21 communities in the Basin served by public water filtration plants. The population served comprises 207,750 people or about 85 per cent of the population of the Basin residing in communities 57/. Many of these supplies are chlorinated as well as filtered.

2. Chlorinated Supplies:---The same report lists 4 communities in the Basin served by public water supplies without filters, but equipped with chlorination plants. These serve 6,982 persons or approximately 3 per cent of the population residing in communities. 57/

3. Industrial Supplies:---At the present time there is no State Department having jurisdiction over industrial water supplies and no complete up-to-date data concerning them are available. The Water Resources Inventory Report of the Water Supply Commission (1916) listed industrial supplies but these data are considered obsolete.

In general, industries are located along the main streams and derive their supplies from them. No information regarding the adequacy of these supplies is available although it is believed that the operation of Pymatuning Reservoir to control low flow will help to make adequate supplies available.

(d) Irrigation:---None of importance known.

(e) Water Power:---

1. Mechanical:---There are no mechanical plants in the Basin developing over 100 horse power.

2. Hydro-electric:---There are 2 hydro-electric plants on the Beaver River, located near its mouth, operated by the Beaver Valley Water

Company. One plant, at Eastvale, operates under an 11 foot head and develops 730 horsepower; the other plant, at New Brighton, operates under a 14 foot head and develops 440 horsepower.

(f) Drainage:--- None of importance known.

(g) Recreation and Wild Life:---Counties mainly in the Basin (Beaver, Butler, Lawrence and Mercer) now contain only 1,367 acres of State land. This is owned by the Game Commission. Besides this the State owns 20,073 acres of land constituting the site of the Pymatuning Reservoir in Crawford County, approximately 16,000 acres are flooded when the reservoir is full. There is a 2,500 acre wild life refuge on the upper end of this reservoir. A low water dam maintains a pool for this refuge.

In the four counties above mentioned are 1,814 acres of park and recreation land. This includes 414 acres of municipally owned land, the balance being privately owned probably largely golf courses. This is considered inadequate and recommendations have been made 58/ for the future acquisition of an additional 10,000 acres of park and recreation land and 150,000 acres of government owned forest land.

The Pennsylvania Fish Commission is conducting a program of stream improvement as a W.P.A. project for the smaller unpolluted streams where the flood hazard to such improvement is not too great. In the Beaver Basin this work is being carried on in Beaver, Butler, Crawford, Lawrence and Mercer Counties.

(h) Correlated Uses:---Pymatuning Reservoir is an example of correlated use. This reservoir was built primarily for flood control and low flow control. A low water dam has been constructed at its upper end and a 2,500 acre wild life refuge is located there. The reservoir was designed to make possible the maintenance of a minimum flow in the Beaver-Shenango

58/ Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934. pp 170-172.

Rivers of 400 second feet. 59/ Studies are now being made by the Sanitary Water Board to determine the flow required to meet the need for public water supply and sanitation in the Beaver-Shenango Rivers.

(i) Imported and Exported Water Supplies:--- None of importance known.

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59/ Preliminary Report Pennsylvania State Planning Board, Harrisburg, Pennsylvania. December 1934. Page 191.

## V UNDERGROUND WATERS

(a) Extent of Areas and Supply:--- Ground water is generally available throughout the Basin in glacial out wash gravel and sandstones. Shales and coal are also used as a source of supply.

There are maps available 60/ showing the occurrence and distribution of these formations in the Basin and the location of wells on which data are available indicating depth and description of water bearing materials.

(b) Character or Quality:--- The amount of dissolved mineral matter in waters from members of the various gravel and rock formations in the Basin differs widely. The accompanying table shows the maximum, average and minimum amounts of dissolved mineral matter in waters from glacial drift, sandstone and shale.

| | Water from glacial drift (36 analyses) | | | Water from sandstone (34 analyses) | | | Water from shale (10 analyses) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Average | Minimum | Maximum | Average | Minimum | Maximum | Average | Minimum |
| Total dissolved solids | 881 | 280 | 124 | 3,186 | 259 | 23 | 3,826 | 303 | 136 |
| Silica ($SiO_2$)......... | 30 | 15 | 6.6 | 22 | 12 | 5.8 | 16 | 12 | 6 |
| Iron (Fe)............. | 4.03 | 0.65 | .01 | 42.0 | 2.9 | .01 | 10.98 | .28 | .02 |
| Calcium (Ca).......... | 190 | 55 | 22 | 188 | 30 | 2 | 40 | 26 | 6 |
| Magnesium (Mg)........ | 26 | 11 | 6.1 | 37 | 8 | 1.8 | 14 | 9 | 5.9 |
| Sodium and Potassium (Na/K)............... | 111 | 27 | 2.2 | 953 | 56 | 1 | 1,438 | 81 | 6 |
| Bicarbonate radicle ($HCO_3$)............... | 292 | 154 | 88 | 408 | 165 | 6 | 862 | 234 | 10 |
| Sulphate radicle (SO). | 331 | 62 | 5.1 | 225 | 30 | 1.5 | 195 | 21 | 2 |
| Chloride radicle (CL). | 144 | 27 | 1.2 | 1,761 | 39 | 1 | 1,868 | 31 | 2.7 |
| Nitrate radicle (NO).. | 50 | 9 | .05 | 12 | 0.81 | 0 | 25 | 1.3 | 0 |
| Total hardness........ | 582 | 182 | 81 | 622 | 106 | 17 | 152 | 96 | 34 |

60/ Information from "Ground Water in Northwestern Pennsylvania", by R. M. Leggette, U.S.G.S., Bulletin W-3 Pa., Geological Survey-Harrisburg, Pa., 1936. "Ground Water in Southwestern Pennsylvania", By Arthur M. Piper, U.S.G.S., Bulletin W-1 Pa., Geological Survey-Harrisburg, Pa., 1933.

The most objectionable mineral constituent occurring in the Basin's groundwater is iron. Concentrated brines occur in the deeper formations. Data derived from the analysis of samples obtained from individual wells throughout the area are available.

(c) Economic Availability:---Groundwater is extensively used and is economically available for domestic and industrial water supplies in the Beaver Basin.

(d) Extent of Use:---According to the Report on "Groundwater in Northwestern Pennsylvania" and "Groundwater in Southwestern Pennsylvania", 14 communities in the Basin are served water from wells or springs by public water supply plants. The population served by these supplies is estimated to be roughly 7 per cent of the population residing in communities (1934). Most of the private wells listed in the above mentioned reports are utilized for domestic water supply in rural areas.

(e) Prospective Uses:---It would appear that groundwater will continue to serve as a source of small domestic supplies, since it requires little treatment and relatively inexpensive water works. It is particularly well adapted for industrial use as cooling water.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

See the general discussion of this subject contained in the Report on the Upper Ohio Basin.

(a) Sewage:---The Pennsylvania Department of Health submitted a report to the Pennsylvania State Planning Board in March 1935 which listed in the Beaver Basin 16 communities having sewage collection and treatment works. Mention was made of one other community, sewage from which was treated at an adjoining treatment works. The 1934 population of these communities was 162,675 persons 61/ or about 67 per cent of the 1934 community population. 62/

The same report listed 10 communities in the Basin having public sewers but no treatment works. These sewers emptied into streams or into sewers of an adjoining community. They did not necessarily serve the total population of the places having them. This total population, however, in 1934 comprised 40,168 people or about 16 per cent of the community population 62/.

The report indicated that orders to install treatment works as conditions to permits had been issued by the Department of Health to 3 of these communities, Farrell, Jamestown and West Middlesex.

Farrell now is constructing a treatment works as a P.W.A. project and Jamestown has prepared plans for a disposal plant and proposes to build it as a W.P.A. project. These two places had a combined population (1934) of 14,230 persons. Eliminating these last two places from the

61/ Estimated by the Pennsylvania State Planning Board.
62/ See Table VIII. This figure is made up of the population if incorporated places in 1934 as estimated by the Pennsylvania State Planning Board plus the population of unincorporated places in 1934 as reported by Rand-McNally and Company.

group having sewers but no treatment works reduces this group to about 10 per cent of the Basin's community population. A complete check of W.P.A. projects has not been made so that it is possible that other disposal plants are under construction. Appendix B contains a tabulation of all cities and boroughs and unincorporated places (having a population of over 500) within townships in the Basin. This tabulation lists for each community the status of sewage disposal and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

While sewage pollution in the Basin has not been entirely cleared up, it does not constitute a major problem. The installation of disposal plants was greatly accelerated when the construction of Pymatuning Reservoir was authorized, since the degree of treatment required was considerably lowered in view of the anticipated control of low water flow by means of the reservoir.

The combined effect of the treatment of sewage and the release of water from Pymatuning Reservoir to augment the low flows in warm weather will noticeably improve the sanitary condition of the Beaver-Shenango River.

The Mahoning River which joins the Shenango below New Castle to form the Beaver River is heavily polluted with both sewage and industrial waste as it enters the State from Ohio.

It is evident that this situation must be corrected before pollution of the Beaver River can be abated.

(b) Trade Waste:---Reference is made to the general discussion of this subject under the same heading in the report on the Upper Ohio Basin.

The Department of Health has conducted a Sanitary Survey of the

Beaver and Shenango Rivers and has prepared charts showing the results of traverses indicating Dissolved Oxygen, B. O. D., Acidity and Oxygen Balance.

While the Department has in its files a mass of data pertaining to pollution by trade waste, no comprehensive summary of factual data is available and the time allowed for this study would not permit the analysis of the above material to obtain such data.

It is known, however, that waste from iron and steel works, creameries, and other industrial plants, located along the stream is discharged and that while a certain degree of cooperation is obtained this source of pollution is an important problem in the Beaver Basin.

(c) Oil Field and Mining Wastes:---The extent of pollution from these sources is not known. While these industries are not of such great extent in this Basin as in the Upper Ohio, there are a large number of gas and oil wells and bituminous coal mines, which contribute to the trade waste pollution. The W.P.A. Mine Sealing Program now in operation is engaged in sealing abandoned mines, which will help to abate acid pollution. The State Department of Health, in charge of this work in Pennsylvania, is conducting a reconnaissance survey to obtain factual information pertaining to the number of abandoned mines, amount of acid drainage and the effects of the work accomplished. It is expected that this information will be available in the near future.

(d) Silt and Erosion:---The Reconnaissance Erosion Survey of the State of Pennsylvania made by the Soil Conservation Service in May 1935, the results of which are graphically portrayed on a map on file at the Pennsylvania State Planning Board office, indicates that the lower portions of the Basin are subject to "moderate sheet erosion with occasional gullies." More limited areas above New Castle are subject to "moderate sheet erosion."

While no factual data are available on silting in this area, it would seem probable from the above situation that considerable silt would be carried by streams of the Basin. The Army Engineers have indicated the necessity of slope paving to protect alluvial banks of the streams from erosion. 63/

(e) Irrigation and Drainage:---None of importance as far as it is known. Swamps are prevalent in the northern part of the Basin, and some swamp land has been drained for agricultural use. The drainage of swamp land has been accomplished by the individual farmers, and no large scale drainage projects exist.

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63/ Beaver, Shenango and Mahoning Rivers - H. D. #277, 73rd Congress, 2nd Session. Page 83.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:---Claims of the Basin's industries would seem to indicate the need for Navigation for the Beaver and Mahoning Rivers (See Section IV a).

The Army Engineers report favorably on the development of these streams for navigation as far as Struthers, Ohio to provide a 12 foot channel and a width of from 200 to 250 feet 64/ . The District Engineer at Pittsburgh is now studying two alternate routes for a canal providing for navigation between the Ohio River and Lake Erie. The Corps of Engineers seems to be the only agency which has studies this matter and since their report has not yet been issued no definite or official recommendations or estimates are available 65/.

(b) Flood Control:---On this subject the President's Committee on Water Flow in its report 66/ states: "The valley is subject to occasional destructive floods, but the flood problem is not regarded as of first magnitude." While this is true there is a decided deficiency in and a future need for flood control.

The Army Engineers have indicated 67/ the possibility of providing a large measure of protection by the construction of two reservoirs, one on the Mahoning River about 4.7 miles above Warren, Ohio, and the other

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64/ Beaver, Shenango, and Mahoning Rivers, Pennsylvania and Ohio. Report of the Chief of Engineers, U.S. Army - House Document No. 277 - 73rd Congress, 2nd Session - Washington, D.C., March 3, 1934.

65/ Certain information is available at the District Office of the Corps of Engineers in Pittsburgh and may be referred to there, although it does not become official information until the report containing it is transmitted to Congress.

66/ "Development of the Rivers of the United States" - House Document #395-73rd Congress, 2nd Session - Washington, D.C. - Page 277.

67/ Ohio River - Report of Chief of Engineers, U.S. Army. House Document #306 - 74th Congress, 1st Session - Page 79.

on the Shenango River about 2 miles from Sharpsville. The conclusion reached in this report, however, was that these reservoirs are not at present economically justified.

Studies made by the Water and Power Resources Board of the State Department of Forests and Waters indicate the need for channel improvements to control floods at the cities of Sharon, New Castle and Butler. (See Section IV - b).

(c) Municipal, Domestic and Industrial Supplies:---In this regard the President's Committee on Water Flow in discussing this subject states: 66/

"Deficiencies in supply of water from natural sources and existing artificial storage to meet existing demands occur at extremely low stages. Such deficiencies will be made up in part at least by the operation of the Pymatuning Reservoir, and the situation will be further improved by the storage contemplated in connection with the proposed navigation project. No other remedies appear to be required presently or in the near future."

The matter of water supply is not a critical problem in the Beaver Basin since there are few places of importance not now adequately served.

The Pennsylvania Department of Health in a report to the Pennsylvania State Planning Board, March 1935, listed 2 communities in the Beaver Basin now depending on private wells and springs for their source of supply which it felt should have public supplies. These places have a combined population of 1,038 persons.

The report listed 2 other communities having a combined population of 13,488 persons, now having public water supplies but where improvements to the water works are needed. These places are listed in Appendix A.

(d) Irrigation:---Irrigation has in the past not been considered necessary in Pennsylvania. This would not be considered a matter of urgent need although the irrigation of crops at "critical periods" in climates where the average annual rainfall is adequate has been advocated 68/ The possibility of use of water for such irrigation might therefore be given study in the consideration of the multiple use of water.

(e) Water Power:---See general discussion of Water Power in Upper Ohio Basin Report.

It was indicated in Section IV-e, that there are only two small Hydro-Electric Plants in the Beaver Basin. The Army Engineers "308" Report on the Beaver River has not been completed, and its recommendations on this subject are not known. The report of the President's Committee on Water Flow 69/ contains some data on this subject presumably derived from the Army Engineer's Studies. It states: "Recent studies have been made of water power possibilities in the valley and the important ones are listed as follows:

| Stream | Project Name | Installation Kilowatts | Estimated Cost |
|---|---|---|---|
| Slippery Rock Creek | Kennedy | 11,100 | $1,130,000 |
| " " " | Crocker | 4,550 | 813,000 |
| " " " | Mountsville | 8,400 | 695,000 |
| " " " | Breakneck Bridge | 8,400 | 1,090,000 |
| Connoquenessing Creek | Hazeldell | 4,200 | 552,000 |
| " " " | Rock Point | 4,200 | 621,000 |
| Slippery Rock Creek | Wayne | 4,000 | 655,000 |
| Total | | 44,850 | 5,556,000 |

68/ "Little Waters" - By H. S. Person, National Resources Committee, April 1936. Washington, D. C. Page 60.
69/ "Development of the Rivers of the United States" - House Document #395-73rd Congress, 2nd Session - Washington, D. C. Page 277.

"Several of these prospective developments appear to be reasonably attractive for development in the near future. Their output is small and their development would probably depend upon local requirements which, with normal growth should be capable of absorbing their production if developed step by step at a reasonable rate."

(f) Drainage:---Drainage is not a need of the Beaver Basin.

(g) Recreation and Wild Life:---There is a very definite need for the development of water bodies for recreational use in the Beaver Basin.

Swimming, boating and fishing are forms of recreation of increasing popularity and wherever possible, provision for them should be made in connection with other developments. Recreational use of the Basin's waters is dependent on the abatement of contamination.

In connection with the construction of large reservoirs it is considered desirable to include the construction of low water dams in the draws of the main reservoir in order to maintain pools for the propagation of fish, and water-fowl and fur-bearing animals when the large reservoir is drawn down. Mr. O. M. Deibler Commissioner, Pennsylvania Fish Commission recommends a minimum water area for such pools of 5 acres.

The Pennsylvania Department of Forests and Waters and the Game Commission have recommended the acquisition of over 150,000 acres of forest and game land in counties mainly in this Basin. (See section IV-g).

(h) Rectification of Existing and Prevention of Future Contamination:---Sewage pollution in the Pennsylvania portion of the Beaver Basin is not a major problem. The situation has been largely cleared up through the efforts of the Health Department in recent years. There are certain places where sewers and treatment works are needed and these are largely indicated in

Appendix B.

There is a definite need for the rectification of existing trade waste contamination as well as its future prevention. The Department of Health has worked toward this end but has no strong supporting legislation behind it. The Fish and Game Commissions together with Deputy Attorney General Grover Ladner favor stringent legislation to provide for this matter and favor the Lonergan Pollution Bill (S-3958) which was considered in the last session of Congress.

LAKE ERIE BASIN

## I. GENERAL DESCRIPTION OF THE ERIE BASIN 70/

(a) Length:---Maximum 26 miles.

(b) Breadth:---Maximum 48 miles.

(c) Area:---In Pennsylvania 512 square miles. 71/

(d) Physiography:---The surface slopes in a series of terraces from an elevation of 1300 to 1400, to 600 to 700, which latter elevation is that of the bluff along the lake shore. Numerous streams coming down from the divide, when nearing the lake, cut through this bluff and flow in narrow and precipitous channels. The streams have rapid fall when heading toward the lake, while their slope becomes much less when paralleling the direction of the lake shore.

The formations are alluvial and consist of clay, sand, shale and sandstone. Gas, oil and iron ore are found.

(e) Cover:---See Reconnaissance Land Use Map (Fig. II) and table XI which indicates the proportion of various types of cover within the Basin.

(f) Climate:---Mean annual precipitation varies from 35 to 40 inches. Rainfalls in excess of 2.5 inches in 24 hours are comparatively rare. The average annual snow-fall is 50 inches. The mean annual temperature is 48°.

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70/ Source:- Paragraphs (a) and (b) - Scaled from Stream Map of Pennsylvania-scale 6 miles = 1 inch.
Paragraphs (c) and (d) - Water Resources Inventory Report, Part III Gazetteer of Streams. - Pennsylvania Water Supply Commission, Harrisburg, Pennsylvania, 1916.
Paragraph (f) Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania, December 1934 - Page 71.

71/ All further references to the Erie Basin in this report, except as noted, refer to that portion of the basin lying within Pennsylvania.

Temperatures of 100° and higher have been recorded. There is an average of 15 days annually with temperatures of 90° or higher, an average of 100 days or more with freezing temperatures and temperatures of -20° are often recorded. Prevailing winds generally are from the northwest.

(g) <u>General Relation to Adjoining Basins</u>:---The Erie Basin is bounded on the south by the Beaver and Upper Ohio Drainage Basins; on the north by Lake Erie; on the west by the Erie Basin in Ohio and on the east by the Erie Basin in New York State.

## TABLE XI

## APPROXIMATE FORESTED AND CLEARED LAND CLASSIFICATION

## ERIE DRAINAGE BASIN IN PENNSYLVANIA

| Classification | Area in Acres | Percentage of Area |
|---|---|---|
| Forested | 74,000 | 23% |
| Cleared - Non-farm | 20,000 | 6% |
| Cleared - Farm | 204,000 | 62% |
| Urban - R.R., Highways, etc. | 30,000 | 9% |
| Total Land | 328,000 | |

Note- Prepared from County Area data in the files of the Department of Forests and Waters, assuming parts of counties in any watershed have same proportions of each land class as the entire county.

## II HUMAN OCCUPANCY

In 1930 the Erie Basin had a population of 155,410 persons. 72/ This comprised about 1.6 per cent of the population of Pennsylvania and 0.1 per cent of the population of the United States. The average population density in 1934 was 304 per square mile.

(a) Cities and Towns:---Information regarding the number, classification by population, size and rate of development, and general character of cities and towns of the Basin is given in tables XII and XIII.

(b) Rural Development:---

1. Agriculture 73/:---The portion of the Basin bordering the lake is in the Lake Erie Fruit, Dairy, Poultry and Vegetable Area and the remainder of the Basin lies in the Northwestern Dairy region.

Table XIV gives statistics pertaining to counties mainly within the Basin and shows trends in Agricultural Development. The trend has been downward from 1900 to 1930 but shows a decided reversal for the past 5 years.

2. Industrial (decentralized):---The major decentralized industries of the Erie Basin include the manufacture of metal and metal products, paper and printing, leather and rubber goods, food and kindred products and the extraction of sand, clay and gravel.

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72/ Based on U. S. Census 1930. Where Civil Subdivisions are split by Drainage Basin Boundary, portion in each Basin is estimated as proportional to area.

73/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pa., Dec. 1934, page 106.

TABLE XII

POPULATION CLASSIFICATION OF ERIE BASIN

| CLASSIFICATION | No. in 1930 | U.S. CENSUS 1900 Population | U.S. CENSUS 1900 Per Cent of Total Basin | U.S. CENSUS 1930 Population | U.S. CENSUS 1930 Per Cent of Total Basin | U.S. CENSUS 1930 Per Cent of Community Pop. | ESTIMATED 1934 ** Population | ESTIMATED 1934 ** Per Cent of Total Basin | ESTIMATED 1934 ** Per Cent of Community Pop. | Population Change 1900 -- 1930 Number | Population Change 1900 -- 1930 Per Cent | Population Change 1930 -- 1934 Number | Population Change 1930 -- 1934 Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CITIES AND BOROS | | | | | | | | | | | | | |
| 100,000 - over | 1 | 52,730 | 65.9 | 115,967 | 74.6 | 86.2 | 108,093 | 71.8 | 85.1 | 63,237 | 119.9 | -7,874 | -7.3 |
| 50,000 - 100,000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 25,000 - 50,000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 10,000 - 25,000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5,000 - 10,000 | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2,500 - 5,000 | 2 | 2,070 | 2.6 | 6,524 | 4.2 | 4.8 | 6,808 | 4.5 | 5.4 | 4,454 | 215.2 | 264 | 4.4 |
| Under - 2,500 | 10 | 4,250 | 5.3 | 7,670 | 4.9 | 5.7 | 7,889 | 5.2 | 6.2 | 3,420 | 80.5 | 219 | 2.9 |
| TOTAL CITIES AND BOROS | 13 | 59,050 | 73.8 | 130,161 | 83.7 | 96.7 | 122,790 | 81.5 | 96.7 | 71,111 | 120.4 | -7,371 | -6.0 |
| TOWNSHIPS | | 20,963 | 26.2 | 25,249 | 16.3 | - | 27,723 | 18.5 | - | 4,286 | 20.4 | 2,474 | 9.8 |
| Unincorporated Villages | | | | * 4,420 | 2.9 | 3.3 | 4,420 | 3.0 | 3.4 | - | - | - | - |
| Scattered | | | | 20,829 | 13.4 | - | 23,303 | 15.5 | - | - | - | 2,474 | 11.9 |
| TOTAL Population Residing in Communities | | | | 134,581 | 86.6 | 100.0 | 127,210 | 84.5 | 100.0 | - | - | -7,371 | -5.8 |
| GRAND TOTAL ERIE BASIN | | 80,013 | 100.0 | 155,410 | 100.0 | - | 150,513 | - | - | 75,397 | 94.2 | -4,897 | -32.5 |

* 1934 Estimate by Rand McNally & Company.
** Estimate by Pennsylvania State Planning Board.

(1900 Per Cent of Pennsylvania Population in Erie Basin 1.3 - of U.S. .1
(1930 Per Cent of Pennsylvania Population in Erie Basin 1.6 - of U.S. .1

TABLE XIII

CLASSIFICATION OF CITIES AND BOROUGHS IN ERIE BASIN

| Cities and Boroughs | County | Population-1930 U. S. Census | Percent Increase 1900 -- 1930 | Predominant* type of Industry |
|---|---|---|---|---|
| 100,000 and over (1) | | 115,967 | 119.9 | |
| Erie | Erie | 115,967 | 119.9 | T & M |
| 2500 to 5000 (2) | | 6,524 | 215.2 | |
| North East | Erie | 3,670 | 77.5 | M |
| Wesleyville | Erie | 2,854 | | A |
| Total under 2500 (10) | | 7,670 | 80.5 | |
| Totals, Cities and Boroughs (13) | | 130,161 | 120.4 | |

* A - Agriculture (M) - Mining T - Transportation M - Manufacturing.

TABLE XIV

Number of Farms and the Amount of Land in Farms
For Counties Located Mainly in the Erie Basin.

| Year | No. of Farms | Land in Farms (acres) | Per Cent of Total Area | Per Cent of Farm Land in Pennsylvania |
|---|---|---|---|---|
| 1900 | 5,957 | 459,861 | 92.0 | 2.4 |
| 1910 | 5,511 | 447,691 | 89.6 | 2.4 |
| 1920 | 5,485 | 438,524 | 87.7 | 2.5 |
| 1925 | 5,698 | 425,331 | 85.1 | 2.6 |
| 1930 | 4,885 | 387,136 | 77.5 | 2.5 |
| 1935 | 5,386 | 403,563 | 80.7 | 2.5 |

Source:- Census of Agriculture - The Department of Commerce.

(c) Analysis of Past Trends, Present Conditions and Probable Future Tendencies Under Sections (a) and (b).

1. Cities and Towns:---Study of Table XII indicates the rapid growth of cities and boros in the Basin which more than doubled in population between 1900 and 1930, and which as a whole have shown a slight decrease between 1930 and 1934. The tendency to draw together to form communities is indicated by the fact that in 1900 about 74% of the Basin's population lived in boros and cities whereas in 1930 these places included approximately 84% of the population. During the last five years the statistics indicate a limited "back to the land" movement. This is thought to be a temporary condition accountable to the depression causing a temporary interruption in the longer trend. Even though the "decentralization of industry" movement may continue to develop, it is believed that people will continue to dwell in communities where the benefits of group service and culture are more amenable to a highly developed civilization.

2. Agriculture:---Trends in agricultural development shown in Table XIV indicate as would be expected the reverse of those showing development

of cities and towns, a dropping off in number of farms, and area of farm land. This is in line with improved agricultural production methods and the consequent decrease in needed acreage and man-power despite increasing production. The reversal in trend during the past 5 years is believed to be temporary and is probably accounted for by the fact that land formerly abandoned as incapable of producing an adequate return is now occupied by persons forced to leave the cities by depressed industrial conditions.

(d) Transportation Facilities:---

1. Water-ways:--There are no navigable rivers in the Erie Basin.

2. Highways:---The Basin is traversed by well paved highways connecting principal centers of population. There is on file with the Pennsylvania State Planning Board a map issued by the State Highway Department showing the Highway systems in detail.

3. Railways:---The Basin is traversed by various railroads including the Pennsylvania; Bessemer and Lake Erie; New York Central; New York, Chicago and St. Louis, and several minor roads.

4. Airports:---There are 3 airports in the Erie Basin and one air lane traverses it. Maps showing the location of the airports and air lanes are on file with the Pennsylvania State Planning Board. Descriptions of the airports are also available. 74/

74/ Descriptions of Airports and Landing Fields in the United States. - U. S. Department of Commerce, Airway Bulletin #2, September 1, 1934.

## III STREAMS OF THE BASIN 75/

(a) SIXTEENMILE CREEK — Tributary to Lake Erie

1. Source:---In New York, near Pennsylvania-New York boundary.

2. Course:---Westerly into Pennsylvania; thence northwesterly and northeasterly to Lake Erie two miles north of North East; elevation 573.

3. Length:---In Pennsylvania 8.5 miles along stream.

4. Drainage Area:---Total, 17.6 square miles; portion in Pennsylvania, 16.9 square miles of sloping country, with streams running in ravines in alluvial formations through clay, shale and sandstone. The channel is narrow with steep banks.

5. Discharge:---No record.

(b) WALNUT CREEK — Tributary to Lake Erie

1. Source:---In Greene Township, northern central Erie County; elevation 1,380.

2. Course:---Westerly to Lake Erie 8 miles southwest of Erie; elevation 573.

3. Length:---22 miles along stream.

4. Drainage Area:---36.7 square miles of rolling hills with broad valleys and lake terraces; the main valley becomes narrow in lower course. The stream flows through alluvial deposits in a ravine through shale and

75/ Source of this data: Water Resources Inventory Report-Part III Gazetteer of Streams-Pennsylvania Water Supply Commission, Harrisburg, Pa. - 1916.

sandstone in lower 4 miles. Rate of fall, from source to mouth, 40.4 feet per mile.

5. Discharge:---No record.

(c) ELK CREEK — Tributary to Lake Erie

1. Source:---In Waterford Township, central Erie County.

2. Course:---Northwesterly to Lake Erie three miles northwest of Girard; elevation 573.

3. Length:---27.5 miles along stream.

4. Drainage Area:---96.2 square miles of gently sloping area, traversed by streams having gently sloping valleys at headwaters, changing to deep ravines near the Lake. The channel is tortuous, chiefly in lower course; carved in alluvial deposits, having steep banks of shale and sandstone in lower course; and in a deep ravine with wide flat bottom for last 5 miles. Rate of fall, from elevation 720 to mouth, 10 miles, 14.7 feet per mile.

5. Discharge:---No record.

(d) CONNEAUT CREEK — Tributary to Lake Erie

1. Source:---In Summit Township, western Crawford County; elevation 1,195.

2. Course:---Northerly into Erie County to a point 2 miles north of Albion; thence southwesterly into Ohio to Kingsville; thence northeasterly to Lake Erie at Conneaut, Ohio; elevation 573.

3. Length:---In Pennsylvania, 35.5 miles along stream.

4. Drainage Area:---In Pennsylvania, 154.0 square miles of rolling hills and terraces from divide to Lake Erie, the valleys are cut in glacial drift and alluvial deposits through clay, shale and sandstone. Rate of fall per mile: from source to elevation 900, 11 miles, 26.8 feet; thence to State boundary, elevation 732, 24.5 miles, 4.8 feet.

5. Discharge:---No record.

## IV EXTENT AND ADEQUACY OF EXISTING WATER DEVELOPMENT

(a) Navigation:---The Erie Basin has no navigable rivers. Navigation is confined entirely to Lake Erie and Presque Isle Bay. The adequacy of existing facilities is not known.

(b) Flood Control:---Flood control is not a major problem in the Basin. Erie is subject to occasional floods of a minor nature. An underground pressure conduit with a cross-section of 22 feet by 18 feet has been constructed to confine the lower portion of Mill Creek through Erie to the Lake. Proposals have been made for extending this conduit upstream to Glenwood Park.

(c) Municipal, Domestic and Industrial Supplies:---The yearbook of the Pennsylvania Department of Health for 1934 (unpublished) tabulates information on public water works in Pennsylvania as of May 31, 1934, where water is treated.

Computations made on the basis of data from this report indicate that 129,750 persons or approximately 86% of the total population (1934) of the Erie Basin 76/ was served with treated water, either filtered, chlorinated or both.

Complete data are not available concerning places having untreated supplies. It is known, however, on the basis of the report of the Pennsylvania Water Supply Commission (1916) that 2 communities in the Basin are served by untreated public supplies. The 1930 population of these places was 4224 or about 3 per cent of the Basin Community population. It is assumed that those places not listed as served by any of the supplies mentioned above derive their supply from private wells and springs or possibly from industrial supplies.

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76/ See Table XII.

Appendix A contains a tabulation of all cities and boros in the Basin together with unincorporated places within townships, having population of 500 or more. This tabulation lists for each community the status of water supply and such additional information as is now available from data in the files of the Pennsylvania State Planning Board.

1. Filtered Supplies:---The Department of Health Report lists 2 communities in the Basin, Erie and North East, served by public water supply filtration plants. The population served comprises 128,650 people or 85.5 per cent of the population (1934) of the Basin.

2. Chlorinated Supplies:---The same report lists 2 communities, Conneautville and Westminster, in the Basin served by public water supplies without filtration plants, but equipped with chlorination plants. These serve 1100 people or 0.7 per cent of the (1934) population of the Basin.

3. Industrial Supplies:---At the present time there is no State Department having jurisdiction over industrial water supplies and no complete up-to-date data concerning them are available. The water Resources Inventory Report of the Water Supply Commission (1916) listed industrial supplies, but these data are considered obsolete.

In general, industries requiring water in quantity are located along the shores of Lake Erie and derive their supplies from it.

(d) Irrigation:---None of importance known.

(e) Water Power:---

1. Mechanical:---The Water Resources Inventory Report of the Water Supply Commission (1916) listed 4 mechanical water power plants in the

Erie Basin, none of which had a capacity of 100 horse power or over.

2. Hydro-Electric:---There are no hydro-electric plants of 100 horse power or over located within the Erie Basin.

(f) Drainage:---None of importance known.

(g) Recreation and Wild Life:---Erie County now contains 1330 acres of State Owned Game Land and no State Forest Land. In this same area are 219 acres of municipally owned park land, 3000 acres of State Owned Park and Recreation Land and 500 acres of privately owned recreational land. This area of recreational land is considered inadequate and recommendations have been made 77/ for the future acquisition of an additional 500 acres of park and recreational land, 8670 acres of State Game Land and 10,070 acres of County owned forest land.

State Game Land:---State Game Land is being acquired at the rate of 75,000 acres per year for the whole State, at which rate it will require 8 years to complete the acquisition recommended. Funds for the acquisition of this land comes from hunters' licenses and it has been recommended that this program be allowed to proceed undisturbed.

County Forest Land:---This recommendation is based on the counties keeping title to tax delinquent lands instead of constantly reselling them. Cost of land is, therefore, not included for this item.

| | | |
|---|---|---|
| Total future recommended County Land | - | 10,070 acres |
| 25% for immediate acquisition | - | 2,518 acres |
| Cost of stocking @ $10.00 per acre | - | $25,180.00 |

77/ Preliminary Report, Pennsylvania State Planning Board, Harrisburg, Pennsylvania, 1934, pages 170-172.

Dr. W. A. Ziegler of the Department of Forests and Waters recommended consideration of 25% of the total area recommended for immediate acquisition and the balance for later consideration so that the program could be continued over a number of years. This is desirable since present nursery facilities are not adequate to supply the demand of such a large program and would have to be enlarged. Planting stock requires from 2 to 4 years to be developed. Such a program might be considered to cover a two year period so that the entire program might be carried out in a period of 8 years. This would coincide with the rate of acquisition of game lands now under way.

The Pennsylvania Fish Commission is conducting a program of stream improvement utilizing W.P.A. and C.C.C. labor for the smaller unpolluted streams where flood hazards to such developmentsare not too great. The Fish Commission is also restocking unpolluted streams with fish.

(h) <u>Correlated Uses</u>:---None so far as is known.

(i) <u>Imported and Exported Water Supplies</u>:---None of importance known.

## V UNDERGROUND WATER 78/

(a) Extent of Areas and Supply:---The Erie Basin is well supplied with ground water for domestic use and for the smaller municipal and industrial supplies. Small springs are numerous throughout the Basin.

The sand and gravel of the glacial drift are the largest producers of ground water, but the character of these deposits varies so that in some localities they yield little or no water. The shale and particularly the sandy portions of the Chemung formation yield small quantities of water. Owing to the irregular arrangement of the glacial drift in pockets and lenses of permeable material, many of the wells that derive their supply from the glacial drift are flowing wells.

(b) Character or Quality:---The ground waters in the Erie Basin generally have a lower iron content than those in the southern section of the State, though some waters do contain moderate amounts of iron. The sodium Chloride content is high in most of the waters from drilled wells. Wells penetrating the bed rock usually yield salt water. Along the shore of Lake Erie most wells are dug, because deep wells yield salt water.

Data derived from the analysis of samples from individual wells throughout the area are available. 78/

(c) Economic Availability:---The Extent of present use would indicate that ground water is economically available for domestic and limited industrial water supplies in the Erie Basin. A great deal of trouble is

78/ Information from "Ground Water in Northwestern Pennsylvania", by R. M. Legette, U.S.G.S. Bulletin W-3, Pennsylvania Geological Survey, Harrisburg, Pennsylvania, 1936.

encountered in sinking wells into the glacial drift because of the caving of the softer formations into the well.

(d) Extent of Use:---All the towns in the Basin with the exception of Erie and North East depend wholly on ground water as their source of supply.

(e) Prospective Uses:---It would appear that ground water would continue to serve as a source of small domestic supplies in the Erie Basin, since it requires little treatment and relatively inexpensive water works as compared to waterworks using supplies from Lake Erie. The rivers of the Basin, because of the smallness of their drainage basins, will probably not be generally utilized for domestic supplies.

Since the temperature of ground water tends to approximate that of the mean annual temperature of the atmosphere of the locality, it is particularly well adapted for industrial use as cooling water.

Ground water is particularly well suited for use in air-conditioning installations, and large quantities may be demanded for this purpose, especially during the summer months. The period of maximum demand for ground water for this purpose would, however, coincide with the period during which the ground water table is normally at the lowest levels. 79/

A State wide project is being recommended for the study of ground water supplies in the glacial deposits. Inasmuch as it is not desirable to split this project into drainage basins, no detailed information concerning the project is given in this report.

These recommendations are being included in the reports on the Ohio, Susquehanna and Delaware Basins.

79/ Remarks by Dr. George H. Ashley, State Geologist in Conference on Drainage Basin Study with Mr. Weed, June 19, 1936.

## VI POLLUTION OF STREAMS AND UNDERGROUND WATERS

The pollution of streams and underground waters is not a major problem in the Basin.

(a) Sewage:---The Pennsylvania Department of Health submitted a report to the Pennsylvania State Planning Board in March, 1935, which listed in the Erie Basin two communities, Erie and North East, having sewage treatment works. Mention was made of one other community, Wesleyville, sewage from which was treated at Erie. Since receiving this report, a sewage treatment works has been completed at Girard. The 1934 population of these four communities was 117,283 persons or about 78 per cent of the Basin's population. So far as is known, there are no communities in the Basin which have public sewers discharging raw sewage into the streams of the Basin or into Lake Erie.

North East, population 3814, needs additional facilities and improvements at its sewage treatment plant.

(b) Trade Wastes:---The Sanitary Water Board of Pennsylvania has long campaigned for the proper disposal of industrial wastes discharged into the streams of the State. According to information received from the Department of Health, there are two industries which are discharging wastes which create a minor problem.

1. A tannery at Girard, which is cooperating with the Health Department in its cooperative trade-waste agreements, is discharging wastes into Elk Creek. This tannery has recently completed a waste treatment plant which needs some improvements and perhaps additional units for proper-

ly treating its wastes.

2. A paper mill at Erie, which is also a subscriber of the co-operative trade-waste agreements of the Pennsylvania Department of Health, is discharging pulp wastes into Presque Isle Bay. This company recirculates a portion of its waste water, but there have been complaints that white water waste and pieces of pulp are carried to Presque Isle Bathing Beach.

Under normal conditions, the counter-clockwise current in the Bay brings fresh water into the harbor along the beach. A few times each year wind conditions are such that the direction of the current in the Bay is reversed and it is believed that this reversal of motion carries the pulp and waste discharges to the bathing beach. Inspections were made on one occasion but no samples of pulp or evidences of pollution were found. Additional studies are planned by the Health Department and the problem will probably be corrected within a short time.

(c) Oil Field and Mining Wastes:---None of importance known.

(d) Silt and Erosion:---The Soil Conservation Service has prepared an erosion map of the State 80/, which is on file with the Pennsylvania State Planning Board. According to this map approximately 25 per cent of the Basin is subject to "moderate sheet erosion" and a small portion along the eastern boundary is subject to "minor sheet erosion with occasional gullies".

The amount of silt carried by the streams of the Basin is not known.

(e) Irrigation and Drainage:---None of importance known.

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80. Reconnaissance Erosion Survey of Pennsylvania, May 1935 - U. S. Department of Agriculture, Soil Conservation Service, Washington, D. C.

## VII SUMMARY OF DEFICIENCIES AND FUTURE NEEDS

(a) Navigation:---There are no navigable streams within the Basin, and so far as is known there are no projects contemplated for improving any of the streams for navigation.

There is, however, a proposed project for improvements to the harbor at Erie.

(b) Flood Control:---This is of minor importance in the Basin. Erie is subject to occasional floods of a minor nature. An application for the extension of the Mill Creek Conduit upstream to Glenwood Park has been made to P.W.A. The estimated cost of this extension was $400,000.

(c) Municipal, Domestic and Industrial Supplies:---In reference to present needs, the Pennsylvania Department of Health in a report to the Pennsylvania State Planning Board in March 1935 listed 2 communities in the Erie Basin having a population of 1586 persons (1934 estimated population) now depending on private wells and springs as a source of supply, which it felt should have public water supplies. One of these towns, North Girard, is constructing a water works at the present time.

North East (population 3814) was listed in the same report as needing improvements to its present system. These places are listed in Appendix A.

(d) Irrigation:---In the past, irrigation has not been considered necessary in Pennsylvania, and is not considered an urgent need at present.

(e) Water Power:---As indicated in section IV (e) there are no hydro-electric plants in the Basin. The development of hydro-electric power

in the Basin is limited by the size of the drainage basins of the streams, so that no large capacity plants are possible. There are no data available on run-off for any streams in the Basin, so that the possibilities of hydro-electric development are not known. However, in 1935 North East applied for a P.W.A. project for the construction of a hydro-electric plant and distribution system having an estimated cost of $575,000. Plans provided for storing part of the flow of French Creek and diverting it to the Erie Basin, utilizing it under a head of approximately 900 feet.

(f) Drainage:---None of importance known.

(g) Recreation and Wild Life:---There is a definite need for the development of forest and park land in the Erie Basin. (See Section IV (g).)

(h) Rectification of Existing and Prevention of Future Contamination:---Existing conditions would seem to indicate that there are no major cases of pollution within the Basin. The sewage from only a small portion of the Basin's population (22 per cent) is untreated, and none of this is discharged into public sewers.

According to information on hand, North East needs additional facilities for treating its sewage. A project was submitted to P.W.A. in 1935 for the enlargement of the existing plant at an estimated cost of $42,920, but the application was not approved.

The existing facilities of the cities and boroughs in the Basin, together with needed improvements or facilities are contained in Appendix B.

CONCLUSIONS AND PROJECT LIST

FOR

UPPER OHIO AND BEAVER RIVERS

AND LAKE ERIE BASINS IN

PENNSYLVANIA

# VIII COMPREHENSIVE PLAN FOR DEVELOPMENT OF WATER RESOURCES

A comprehensive plan for the development and conservation of the water resources of a drainage basin is properly to be based upon the future use and occupancy of the basin. This plan will be one part of the Master Plan for the area and for the State and, consequently, should be evolved as an integral part of the Master Plan.

Since the realization of any plan for the development of the water resources of a drainage basin requires the cooperation of both public and private interests in formulating and financing developments it is necessary that some degree of control be exercised over the streams and their waters. The amount of control desirable is largely dependent upon the extent and type of water uses; upon the extent and type of developments financed by public funds; and upon the extent and type of interests in the affected states.

For an intra-state stream, state control should be adequate. But the handling of an inter-state stream, such as the Ohio River necessarily requires much cooperation among the states affected, both in the making of plans and in the adoption and administration of regulations.

## UPPER OHIO RIVER BASIN

The Ohio River system drains about one-eighteenth of the surface of the United States and is inhabited by approximately one-seventh of the Nation's people.

The Upper Ohio River Basin, which occupies the north-eastern portion of the Ohio River Basin, embraces an area of 24,300 square miles which contains a population of approximately 3,970,000 persons.

The Pennsylvania portion of the Basin comprises 13,787 square miles containing a population of 2,991,300 persons of which approximately 1,500,000 are concentrated in the Pittsburgh metropolitan district.

In Pennsylvania, the Upper Ohio River drains a highly industrialized region. This region, ideally situated with respect to markets, contains enormous deposits of bituminous coal and other mineral resources. Large amounts of coal, oil, natural gas, glass sand and fire clay are extracted in this area. Many of the Nation's greatest industries have located their plants along the Upper Ohio River and its major tributaries, to take advantage of the navigation facilities, abundant water and mineral resources of the region. These plants manufacture great quantities of iron, steel, glass and clay products.

The River system is used as a source of municipal and industrial water supply, as a sewer, as a means of transportation, as a source of water power and for recreational purposes. Probably no other river in the United States is used so intensively and extensively for municipal and industrial purposes as the navigable portion of the Upper Ohio River and its tributaries.

Since the river system is the only dependable source of public water supply reasonably available to many of the Basin's municipalities, grave problems of water use have developed through the discharge of untreated sewage, industrial wastes, and acid mine drainage into the streams. Utilizing the most modern methods of water treatment, water engineers have been able, through constant vigilance, to convert the polluted river water into safe municipal supplies. However, the quality of the river water at many waterworks intakes is far below the generally accepted standards for raw water supply. Many municipal supplies contain disagreeable tastes and odors. Water treatment is extremely difficult and expensive throughout the Basin, due to its high content of sulphuric acid, sewage and industrial wastes.

Destructive floods have caused great damage to both private and public property located on the flood plains of the river system. The threat of impending floods naturally retards the industrial expansion of the Upper Ohio River Basin. The occurance of a major flood within the next few years may figuratively wash many of the Basin's industries from the banks of the Upper Ohio River to drainage basins wherein the flood menace has been controlled.

While it is not possible to formulate a comprehensive plan for the development of water resources in advance of the Master Plan, a program of partial development consisting of certain projects proposed by various agencies, the need for which has been made evident by this study, can be outlined. The major problems under their general headings are outlined in this section. Section IX is a complete list of all projects submitted; the location of which are shown on Figure I. (Project Map)

(a) Navigation:--- Although extensions to the present navigation system have been proposed at various times, the extensions have been advocated on the basis of lower rates rather than on the basis of inadequate transportation facilities. Since the problem appears to be one of rate differentials rather than adequacy of transportation facilities, no navigation projects are recommended at this time. Before additional navigation facilities are considered, it would seem desirable that the whole transportation system be studied in order to determine whether in a properly coordinated system of all transportation facilities new navigation facilities are necessary, or whether existing facilities with minor extensions and improvements will be adequate.

(b) Flood Control:--- Flood control is a major need of the Upper Ohio Basin. Existing flood protection works are inadequate. Pittsburgh, Etna, Sharpsburg, Turtle Creek, Wilmerding, Ford City, Johnstown, Du Bois, Meadville, Uniontown, Confluence, Oil City, Warren, Jeannette and many smaller communities located along the streams are subject to serious flood damages. Devastating floods have occurred at frequent intervals along the Ohio River and its tributaries. During the past century Pittsburgh has experienced 42 floods of major proportions. In the greatest flood on record, in March 1936, the Ohio River reached a stage of 46 feet at Pittsburgh. This flood caused damages estimated by the National Emergency Council at over $106,000,000.

As indicated in Section VII (b), agencies which have studied the flood problem agree that the only practicable plan for flood control and protection includes the construction of storage reservoirs. The plan proposed by the Corps of Engineers, United States Army, includes the construction of eight large reservoirs in Pennsylvania, at an estimated cost of $53,406,000.

It is recommended that test borings be made at the sites of the proposed dams; that preliminary studies be rushed to completion, and that detailed estimates of costs and benefits be prepared in order that the necessary flood control structures may be built in the near future.

It is recommended that channel lines be established in all areas subject to serious floods, and that local zoning be adopted to prohibit the erection of undesirable types of structures in areas which cannot be adequately and economically protected from floods. It is recommended that such zoning ordinances provide for the gradual elimination of non-conforming uses from flood areas.

It is further recommended that such local flood protection works as

will be economically justified in combination with the proposed flood control reservoirs be constructed.

(c) Municipal, Domestic, and Industrial Supplies:--- Water supply is not a major problem of the Basin, with the exception of the Monongahela Sub-Basin. During periods of low-flow of the Monongahela River, there have been troublesome shortages of water for industrial and municipal purposes. At times the continued re-use of this water for cooling purposes by industries, heats it to such a high temperature that it is of no value for cooling purposes, and industries are forced to close until the flow increases.

Approximately 90 per cent of the Basin's community population is served treated water and 3 per cent untreated water from public supplies. The remainder of the community population utilizes private springs and wells. The quality of the water taken directly from the Ohio River has been impaired by sewage and trade wastes, which makes treatment difficult during periods of low-flow and during freshets following low-flow.

There are in the Basin 53 communities which it is believed should have public water supplies. Improvements or extensions are needed at 62 other communities, 13 of which should have filtration plants, 8 chlorination apparatus, and 11 softening and iron removal plants. These are listed in Section IX, Project List.

(d) Irrigation:--- No irrigation projects are included in the plans for the comprehensive development of the Basin.

(e) Water Power:--- Available sites for water power development are confined to Clarion River, Brokenstraw Creek, French Creek and Mahoning Creek. The aggregate potential power development by these streams is 387,000 kilowatts.

Due to the abundance of cheap fuel, hydro-electric developments are not attractive to private capital in this Basin. Since steam plants are more economical under prevailing conditions, no hydro-electric power projects are recommended for construction.

(f) Drainage:--- No drainage projects are recommended for present or future construction.

(g) Recreation and Wild Life:--- There is a definite need for the development of park and recreational sites in the Upper Ohio Basin. Recommendations have been made by the Pennsylvania State Planning Board for the acquisition of 29,503 acres of park and recreational land and 1,367,751 acres of government owned forest land in counties mainly within this Basin. The development of streams for recreational uses is dependent upon the abatement of pollution.

A study project is recommended for determining the location of suitable sites for recreational purposes in the Basin.

(h) Rectification of Existing and Prevention of Future Contamination:--- Pollution control is the major problem of the Basin. The discharge of untreated sewage, industrial wastes and mine drainage creates involved and troublesome conditions, particularly in the Pittsburgh metropolitan district.

The Monongahela and Allegheny Rivers carry the untreated sewage of approximately two million people, together with large quantities of acid mine drainage and industrial wastes. During times of minimum flow, below the junction of these rivers, about 25 per cent of the water has passed through a sewer system. This water is the only available source of municipal supply for Pittsburgh and the communities along the Ohio River.

During periods of low flow the navigation dams retard the natural flow of the river and form pools through which the water flows at low velocities. The solids from the sewage settle to the bottom of these pools and accumulate in the form of sludge. The presence of great quantities of acid from mine drainage and industrial wastes prevents the putrefaction of this sludge. When the river rises, the sludge is washed down stream. With the influx of fresher waters, the natural putrefaction processes proceed and an extremely heavy load is placed upon the water-works of down river communities. Constant vigilance and the utilization of the most modern equipment and engineering skill are required to prevent the invasion of bacteria into municipal water supplies at such times. Acid waters are occasionaly drawn into distribution reservoirs and service lines, while tastes and odors, arising from industrial wastes, make the water unpalatable. Widespread epidemics of an intestinal nature have been attributed to the water supplies.

It is recommended that sewage treatment plants be constructed for the offending communities as soon as possible and that a united effort be made to reduce the pollution arising from industrial waste discharges. It is further recommended that the mine sealing program for abandoned coal mines be completed.

## BEAVER RIVER BASIN

The Beaver River Basin contains one of the most important industrial areas in the United States. This area is composed largely of rather small manufacturing communities located along the main streams. Metal and metal products are the major industrial products.

The Basin has an area of 3,040 square miles, of which 1784.3 square miles are located in Pennsylvania, the remainder lying in Ohio.

(a) Navigation:--- As indicated in Section VII, the streams of the Basin are not navigable. Although studies made by the Corps of Engineers, United States Army, seem to indicate that a sufficient volume of freight exists to justify the canalization of the Beaver and Mahoning Rivers from the mouth to Struthers, Ohio, no recommendations for a navigation project are made in this report.

(b) Flood Control:--- Flood control is not a major problem in the Basin. Considerable damage has been caused by occasional floods in the past, and existing flood control structures are inadequate. Pymatuning reservoir, constructed for multiple use, provides for the control of flood waters on the Shenango River.

(c) Municipal, Domestic and Industrial Supplies:--- Municipal water supply is not a major need of the Basin, although approximately 68 per cent of the Basin's community population is served by public water supply companies, it is desirable that public supplies be furnished to Mars, Prospect and Jackson Townships in Butler County. Extension and improvements for public water supplies of other communities are listed in Section IX, Project List.

Industrial water supply is the major need of the Basin. The Basin's industries use large quantities of water for cooling purposes which result in the use and re-use of the entire flow of the streams during periods of low flow. At such times many of the industries are forced to close or curtail operations due to the high temperature to which the water is heated. This condition has been partially remedied along the Shenango River by the construction of Pymatuning Reservoir. Along the Mahoning River, however, the problem is serious and, unless remedied, will result in the moving of industrial plants from the Basin.

(d) Irrigation:--- Irrigation is not a need of the Basin.

(e) Water Power:--- Although suitable sites exist for the installation of 44,850 kilowatts of hydro-electric power, the abundance of the cheap coal supply makes such developments unattractive to private capital. The construction of hydro-electric power should not be undertaken until the demand for it has increased.

(f) Drainage:--- No drainage projects are recommended for present or future construction.

(g) Recreation and Wild Life:--- There is a definite need for the development of park and recreational sites in the Beaver River Basin. Although many available sites exist, their utilization is dependent upon the abatement of local pollution.

(h) Rectification of Existing and Prevention of Future Contamination:--- Pollution from sewage is not a major problem of the Basin. The Mahoning River carries a high pollution load, most of which originates in the State of Ohio. The large amount of sewage and acid in this stream restricts the use of its waters in Pennsylvania and causes serious erosion and damages to structures and industrial equipment. The construction of sewage disposal plants for Linesville, Bessemer, New Brighton, Rochester Township, South New Castle, Union Township, West Middlesex, White Township, and Farrell, and of additional units at existing plants for Slippery Rock and Sharon is recommended.

LAKE ERIE BASIN

The portion of the Lake Erie Basin in Pennsylvania has an area of 512 square miles and a maximum width of 26 miles. Because of its small

area and prevailing topographic features, the Basin contains no large streams. Of its 155,410 inhabitants, 115,967 are concentrated along the lake shore, with its abundant water supply, at Erie. There are few water problems in the Basin, and with the exception of navigation, these are minor and local in character.

(a) Navigation:--- Navigation is restricted to Lake Erie and Presque Isle Bay. For many years projects have been considered for a barge canal connecting Lake Erie with the Ohio River. Enormous tonnages of coal, iron ore and steel products could be transported over such a route. However, since it appears that existing transportation facilities are adequate, and that the proposed canal would be justified on the basis of rate differentials rather than on inadequacy of existing facilities, no recommendations for such a canal is contained in this report.

The dredging of the navigation channels at Erie Harbor to depths of 21 and 25 feet is desirable at the present time.

(b) Flood Control:--- Flood control is not a major need of the Basin. The Basin's streams are short and drain relatively small areas.

(c) Municipal, Domestic and Industrial Supplies:--- Lake Erie furnishes an abundant supply of water for municipal, domestic and industrial purposes for the population living along its shores. The construction of public water supplies for Cranesville and Springboro is desirable; the construction of a water main to Presque Isle, a filtration plant at Albion and extensions to the existing plant at North East are recommended.

(d) Irrigation:--- Irrigation is unnecessary in the Basin.

(e) Water Power:--- The smallness of the Basin's streams restricts their use for water power development and no water power plants are recommended for construction.

(f) Drainage:--- Drainage is not a need of the Erie Basin.

(g) Recreation and Wild Life:--- There is a definite need for the development of forest and park land in the Erie Basin. There is a large amount of below-average farm land in the Basin, which could be developed as public forest and park land.

(h) Rectification of Existing and Prevention of Future Contamination:--- The pollution of streams and underground waters is not a major problem. The construction of a sewage disposal plant at North Girard, construction of additional units at the existing plant at North East, and the extension of sewers at Erie are desirable.

## IX PROJECT LIST

The projects listed are recommended as a part of the comprehensive development of the Upper Ohio River Basin in Pennsylvania.

Information concerning these projects was obtained from various sources, including the Pennsylvania Department of Health, Sanitary Waters Board, Pennsylvania Department of Forests and Waters, Drainage Basin Consultants for the National Resources Committee, U.S.A., Corps of Engineers Reports, National Inventory of Works Projects, and Public Works Administration.

Inasmuch as the time allotted did not permit the reporting agencies to make detailed cost analysis for many of the projects submitted, the information has been treated as advance confidential data. For this reason the name of the reporting agency is not included in the project list.

### GROUP I - IMMEDIATE CONSTRUCTION

Projects which are ready for construction, and should be undertaken as soon as possible.

POLLUTION ABATEMENT

1. Aliquippa, Beaver Co., Pa. - Pollution Abatement. Construction of intercepting sewer, sanitary sewers and primary treatment sewage disposal plant. No cost estimate available.
2. Ambridge, Beaver Co., Pa. - Pollution Abatement. Construction of intercepting sewer and primary treatment sewage disposal plant. No cost estimate available.

3. Baden, Beaver Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

4. Beaver, Beaver Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

5. Freedom, Beaver Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

6. Hopewell Township, Beaver Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. No cost estimate available.

7. Knox, Clarion Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

8. Midland, Beaver Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

9. Mifflin Township, Allegheny Co., Pa. - Pollution Abatement. Construction of a sewer system and sewage treatment plant. No cost estimate available.

10. Monaca, Beaver Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

11. Pittsburgh, Allegheny Co., Pa. - Pollution Abatement. Construction of intercepting sewers and primary treatment sewage disposal plants. No cost estimate available.

12. Basin Wide. - Pollution Abatement. Sealing of abandoned mines to reduce acid in streams which adversely affects water supplies and injures metal and concrete structures. Estimated cost - $4,000,000.

MISCELLANEOUS

13. Basin Wide. - Recreation. Study to determine suitable sites for recreational lands. Estimated cost - $50,000.

## GROUP II - DEFERRED CONSTRUCTION

Projects which, while desirable for immediate construction, (a) involve controversial questions, (b) can have their priority definitely determined only after additional studies which cannot be completed in time for this report, or (c) are now obstructed by legal administrative or other difficulties.

FLOOD CONTROL

Construction of flood control reservoirs on the following rivers and creeks:

| | | | | |
|---|---|---|---|---|
| 14. | Allegheny | Estimated cost | - | $17,725,000. |
| 15. | Tionesta | Estimated cost | - | $ 3,488,000. |
| 16. | Crooked Creek | Estimated cost | - | $ 2,298,000. |
| 17. | French Creek | Estimated cost | - | $ 3,867,000. |
| 18. | Conemaugh | Estimated cost | - | $14,097,000. |
| 19. | Loyalhanna | Estimated cost | - | $ 2,640,000. |
| 20. | Mahoning Creek | Estimated cost | - | $ 3,322,000. |
| 21. | Red Bank | Estimated cost | - | $ 5,969,000. |

POLLUTION ABATEMENT

22. Arnold, Westmoreland Co., Pa. - Pollution Control. Construction of combined sewer, intercepting sewer and sewage treatment plant. No cost estimate available.

23. Bradford, McKean Co., Pa. - Pollution Abatement. Construction of a primary treatment sewage disposal plant. No cost estimate available.

24. Cannonsburg, Washington Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

25. Connellsville, Fayette Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a sewage disposal plant. Estimated cost - $388,000.

26. Coudersport, Potter Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

27. Donoro, Washington Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

28. East Brady, Clarion Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

29. East McKeesport, Allegheny Co., Pa. - Nuisance Abatement. Construction of intercepting sewers. No cost estimate available.

30. Edinboro, Erie Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

31. Emlenton, Venango Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

32. Ford City, Armstrong Co., Pa. - Pollution Abatement. Construction of a primary treatment sewage disposal plant and extension of sanitary sewers. Estimated cost - $180,000.

33. Franklin, Venango Co., Pa. - Pollution Abatement. Extension of sewers; construction of intercepting sewer and a primary treatment sewage disposal plant. Estimated cost - $392,400.

34. Glenfield, Allegheny Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. No cost estimate available.

35. Greensburg, Westmoreland Co., Pa. - Pollution Abatement. Construction of an intercepting sewer and sewage disposal plant. Estimated cost - $329,000.

36. Homer City, Indiana Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. No cost estimate available.

37. Houston, Washington Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

38. Irwin, Westmoreland Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage treatment plant. No cost estimate available.

39. Johnsonburg, Elk Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. No cost estimate available.

40. Johnstown, Cambria Co., Pa. - Pollution Abatement. Extension of sewer system and construction of a sewage disposal plant. Estimated cost - $1,750,000.

41. Kane, McKean Co., Pa. - Pollution Abatement. Construction of intercepting sewers and a primary treatment sewage disposal plant. No cost estimate available.

42. Kittaning, Armstrong Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

43. Latrobe, Westmoreland Co., Pa. - Nuisance Abatement. Construction of sanitary sewers and intercepting sewers. No cost estimate available.

44. Marianna, Washington Co., Pa. - Pollution Control. Construction of sanitary sewers and a sewage treatment plant. No cost estimate available.

45. Mt. Jewett, McKean Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

46. Mt. Pleasant, Westmoreland Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

47. Nanty-Glo, Cambria Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

48. New Kensington, Westmoreland Co., Pa. - Pollution Abatement. Extension of sanitary sewers, intercepting sewer and a sewage disposal plant. No cost estimate available.

49. North Apollo, Armstrong Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. No cost estimate available.

50. Oil City, Venango Co., Pa. - Pollution Abatement. Construction of combined sewers, intercepting sewers and a primary treatment sewage disposal plant. Estimated cost - $524,000.

51. Polk State School, Venango Co., Pa. - Pollution Abatement. Construction of a primary treatment sewage disposal plant. No cost estimate available.

52. Port Allegheny, McKean Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

53. Ridgway, Elk Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. No cost estimate available.

54. St. Marys, Elk Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a primary treatment sewage disposal plant. No cost estimate available.

55. Sheffield Township, Warren Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

56. Smethport, McKean Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

57. Tidioute, Warren Co., Pa. - Pollution Abatement. Construction of an intercepting sewer and a primary treatment sewage disposal plant. Estimated cost - $67,000.

58. Tionesta, Forest Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

59. Warren, Warren Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

60. Waynesburg, Greene Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

61. Youngsville, Warren Co., Pa. - Pollution Abatement. Construction of intercepting sewer and a primary treatment sewage disposal plant. No cost estimate available.

WATER SUPPLY

62. Carmichaels, Greene Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $82,000.

63. Salisbury, Somerset Co., Pa. - Water Supply. Construction of a complete new water supply system. Estimated cost - $63,000.

## GROUP III INDETERMINATE CONSTRUCTION

Projects whose specific priority in the program is as yet indeterminate.

POLLUTION ABATEMENT

64. Bellevernon, Fayette Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $21,000.

65. Brookville, Jefferson Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $35,000.

66. Brownsville, Fayette Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $17,000.

67. Charleroi, Washington Co., Pa. - Nuisance Abatement. Construction of intercepting sewer. Estimated cost - $75,000.

68. Clintonville, Venango Co., Pa. - Pollution Abatement. Construction of a sewer system and sewage disposal plant. Estimated cost - $8,000.

69. Cresson, Cambria Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. Estimated cost $30,000.

70. Dubois, Clearfield Co., Pa. - Nuisance Abatement. Extension of sanitary branch sewers and laterals; reconstruction of trunk sewer. No cost estimate available.

71. Dunbar Township, Fayette Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $5,400.

72. Elco, Washington Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $50,000.

73. Export, Westmoreland Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. No cost estimate available.

74. Foxburg, Clarion Co., Pa. - Pollution Abatement. Construction of intercepting sewer and sewage disposal plant. Estimated cost - $8,000.

75. Fryburg, Clarion Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. Estimated cost - $12,000.

76. Jeannette, Westmoreland Co., Pa. - Pollution Abatement. Extension of sanitary sewers and construction of interceptor and disposal plant. Estimated cost - $245,000.

77. Keating Twp., McKean Co., Pa. - Nuisance Abatement. Extension of sanitary sewer. Estimated cost - $300.

78. Knoxville, Fayette Co., Pa. - Nuisance Abatement. Completion of sanitary sewer system. Estimated cost - $20,000.

79. Lorain, Cambria Co., Pa. - Pollution Abatement. Construction of sanitary sewers. Estimated cost - $21,000.

80. Luzerne Twp., Fayette Co., Pa. - Nuisance Abatement. Extension to sanitary sewer system. Estimated cost - $35,000.

81. Manor, Westmoreland Co., Pa. - Nuisance Abatement. Extension of sanitary sewer system. Estimated cost - $20,000.

82. Masontown, Fayette Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $12,000.

83. Meadville, Crawford Co., Pa. - Pollution Abatement. Extension of sanitary sewers. Estimated cost - $25,000.

84. Menallen Twp., Fayette Co., Pa. - Pollution Abatement. Construction of a sanitary sewer system and sewage disposal plant. Estimated cost - $44,700.

85. New Bethlehem, Clarion Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. Estimated cost - $190,000.

86. North Union Twp., Fayette Co., Pa. - Nuisance Abatement. Extension of sanitary sewer system. Estimated cost - $20,000.

87. Perry Twp., Fayette Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $70,000.

88. Redstone Twp., Fayette Co., Pa. - Nuisance Abatement. Construction of sanitary sewers at Cardale, Republic and Merrittstown. Estimated cost - $54,500.

89. Rouseville, Venango Co., Pa. - Nuisance Abatement. Extension of sewer system. No cost estimate available.

90. Scottdale, Westmoreland Co., Pa. - Nuisance Abatement. Reconstruction of sanitary sewer. Estimated cost - $4,200.

91. Speers, Washington Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $13,000.

92. Sugarcreek Twp., Venango Co., Pa. - Pollution Abatement. Construction of intercepting sewer. Estimated cost - $3,000.

93. Trafford, Westmoreland Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $134,000.

94. Uniontown, Fayette Co., Pa. - Pollution Abatement. Construction of intercepting sewer and sewage disposal plant. No cost estimate available.

95. Vanderbilt, Fayette Co., Pa. - Nuisance Abatement. Completion of sanitary sewer system. Estimated cost - $15,000.

96. Washington, Washington Co., Pa. - Pollution Abatement. Extension of sanitary sewers and repairs to sewage disposal plant. Estimated cost - $18,100.

97. Washington Township, Fayette Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $20,000.

98. West Wheatfield Township, Indiana Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $8,000.

99. Youngwood, Westmoreland Co., Pa. - Nuisance Abatement. Extension of sanitary sewers. No cost estimate available.

WATER SUPPLY

100. Allison Park, Allegheny Co., Pa. - Water Supply. Obtain adequate supply and make extensions to system. No cost estimate available.

101. Arensburg, Fayette Co., Pa. - Water Supply. Construction of a filtration plant. No cost estimate available.

102. Avella, Washington Co., Pa. - Water Supply. Construction of an impounding dam and reservoir. Estimated cost - $14,000.

103. Baden, Beaver Co., Pa. - Water Supply. Extension of water lines; construction of a softening, iron and manganese removal plant. Estimated cost - $44,000.

104. Beallsville, Washington Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

105. Beaver, Beaver Co., Pa. - Water Supply. Construction of a water softening plant. Estimated cost - $50,000.

106. Benson, Somerset Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

107. Bentleyville, Washington Co., Pa. - Water Supply. Obtain adequate supply and make extensions to system. No cost estimate available.

108. Blawnox, Allegheny Co., Pa. - Water Supply. Construction of booster pumping station and extension of system. No cost estimate available.

109. Boswell, Somerset Co., Pa. - Water Supply. Construction of a filtration plant. Estimated cost - $3,500.

110. Bolivar, Westmoreland Co., Pa. - Water Supply. Construction of a filtration plant. No cost estimate available.

111. Braddock, Allegheny Co., Pa. - Water Supply. Construction of a filtration plant. No cost estimate available.

112. Bradford, McKean Co., Pa. - Water Supply. Enlargement of No. 2 reservoir. Estimated cost - $200,000.

113. Bradford Woods, Allegheny Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

114. Brockway, Jefferson Co., Pa. - Water Supply. Construction of a new water supply system. Estimated cost - $150,000.

115. Brookville, Jefferson Co., Pa. - Water Supply. Extension of water mains, construction of an additional filter, increased sedimentation facilities, mixing basin for coagulation and miscellaneous improvements. Estimated cost - $60,000.

116. Cecil, Washington Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

117. Central City, Somerset Co., Pa. - Water Supply. Construction of a filtration plant. Estimated cost - $30,000.

118. Clintonville, Venango Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $3,000.

119. Clymer, Indiana Co., Pa. - Water Supply. Construction of a filtration plant for well water supply. No cost estimate available.

120. Coal Center, Washington Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

121. Conway, Beaver Co., Pa. - Water Supply. Construction of a water softening, iron and manganese removal plant. No cost estimate available.

122. Coraopolis, Allegheny Co., Pa. - Water Supply. Construction of a water softening plant. Estimated cost - $40,000.

123. Corsica, Jefferson Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $7,500.

124. Coudersport, Potter Co., Pa. - Water Supply. Construction of reservoir for Cobb Hollow supply. No cost estimate available.

125. Cresson, Cambria Co., Pa. - Water Supply. Extension of water mains. Estimated cost - $800.

126. Crosby, McKean Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

127. Cuddy, Allegheny Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

128. Cyclone, McKean Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

129. Daisytown, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

130. Darlington, Beaver Co., Pa. - Water Supply. Construction of a water supply system. No cost estimate available.

131. Davidsville, Somerset Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $20,000.

132. Dayton, Allegheny Co., Pa. - Water Supply. Construction of water softening and iron removal plant. No cost estimate available.

133. Delmont, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

134. DuBois, Clearfield Co., Pa. - Water Supply. Reforestation of water shed at city reservoir. No cost estimate available.

135. Dunbar Twp., Fayette Co., Pa. - Water Supply. Construction of a water filtration plant. No cost estimate available.

136. Eldred, McKean Co., Pa. - Water Supply. Construction of a storage reservoir. No cost estimate available.

137. Export, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

138. Falls Creek, Jefferson Co., Pa. - Water Supply. Construction of elevated tank, mixing chamber for coagulation and chemical feed facilities. Estimated cost - $6,000.

139. Finleyville, Washington Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $16,000.

140. Fox Township, Elk Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $25,000.

141. Geistown, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

142. Glenfield, Allegheny Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $40,000.

143. Greene Township, Greene Co., Pa. - Water Supply. Construction of a reservoir. Estimated cost - $2,500.

144. Greensboro, Greene Co., Pa. - Water Supply. Obtain adequate supply and make extensions to system. No cost estimate available.

145. Harrison City, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

146. Hazelhurst, McKean Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

147. Hendersonville, Washington Co., Pa. - Water Supply. Obtain new source of supply. No cost estimate available.

148. Herminie, Westmoreland Co., Pa. - Water Supply. Construction of public water supply system. No cost estimate available.

149. Library, Allegheny Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

150. Ligonier, Westmoreland Co., Pa. - Water Supply. Construction of a filtration plant. No cost estimate available.

151. Lincoln Hill, Washington Co., Pa. - Water Supply. Obtain new source of water supply. No cost estimate available.

152. Lovett, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

153. Luthersburg, Clearfield Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

154. Markleysburg, Fayette Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $18,000.

155. Masontown, Fayette Co., Pa. - Water Supply. Extension of water main and installation of an auxiliary pump at water works. Estimated cost - $17,500.

156. Meadville, Crawford Co., Pa. - Water Supply. Installation of water softening plant; construction of a water tank and installation of pumps and piping. Estimated cost - $80,000.

157. Midway, Washington Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

158. Monaca, Beaver Co., Pa. - Water Supply. Construction of a water softening, iron and manganese removal plant. No cost estimate available.

159. Morrison, McKean Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

160. Murrysville, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

161. Nanty-Glo, Cambria Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

162. New Alexandria, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

163. New Florence, Westmoreland Co., Pa. - Water Supply. Construction of a chlorination plant. No cost estimate available.

164. North Union Twp., Fayette Co., Pa. - Water Supply. Construction of a filtration plant. Estimated cost - $60,000.

165. North Warren, Warren Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $25,000.

166. Oakdale, Allegheny Co., Pa. - Water Supply. Obtain adequate supply and the construction of purification works. No cost estimate available.

167. Ohiopyle, Fayette Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $20,000.

168. Oil City, Venango Co., Pa. - Water Supply. Extension of water mains and construction of storage tanks. Estimated cost - $40,000.

169. Oswago, Potter Co., Pa. - Water Supply. Construction of a water supply system for school. Estimated cost - $1,100.

170. Parkers Landing, Armstrong Co., Pa. - Water Supply. Complete overhauling of filtration plant and distribution system. No cost estimate available.

171. Penn Township, Allegheny Co., Pa. - Water Supply. Construction of water lines throughout Township. Estimated cost - $100,000.

172. Perry Township, Fayette Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $92,000.

173. Perryopolis, Fayette Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $50,000.

174. Petrolia, Butler Co., Pa. - Water Supply. Construction of water lines for fire protection. Estimated cost - $10,968.

175. Pittsburgh, Allegheny Co., Pa. - Water Supply. Extensions and replacements of pipe lines; construction of new reservoir and tanks; installation of pumping station equipment and miscellaneous improvements. Estimated cost - $4,341,000.

176. <u>Plumville, Indiana Co., Pa.</u> - Water Supply. Construction of a public water supply system. No cost estimate available.

177. <u>Portland Mills, Elk Co., Pa.</u> - Water Supply. Construction of a public water supply system. No cost estimate available.

178. <u>Ralphton, Somerset Co., Pa.</u> - Water Supply. Construction of a new distribution reservoir and the installation of chlorination apparatus. No cost estimate available.

179. <u>Redstone Township, Fayette Co., Pa.</u> - Water Supply. Construction of a water line and a filtration plant. Estimated cost - $54,500.

180. <u>Reynoldsville, Jefferson Co., Pa.</u> - Water Supply. Construction of an additional impounding dam and reservoir. Extimated cost - $25,000.

181. <u>Ridgeway, Elk Co., Pa.</u> - Water Supply. Construction of a sedimentation basin and miscellaneous improvements to water works. Estimated cost - $15,000.

182. <u>Rimersburg, Clarion Co., Pa.</u> - Water Supply. Construction of one mile of 6" water line; drilling of additional well; installation of aeration and chlorination apparatus. No cost estimate available.

183. <u>Rouseville, Venango Co., Pa.</u> - Water Supply. Construction of a water supply system and extension of water mains. No cost estimate available.

184. Russelton, Allegheny Co., Pa. - Water Supply. Obtain additional supply for emergency use. No cost estimate available.

185. Salina, Westmoreland Co., Pa. - Water Supply. Obtain adequate supply and make extensions to system. No cost estimate available.

186. Salix, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

187. Sandy Lake, Mercer Co., Pa. - Water Supply. Improvements to water system. Estimated cost - $10,000.

188. St. Petersburg, Clarion Co., Pa. - Water Supply. Completion of reservoir and construction of a filtration plant. Estimated cost - $5,000.

189. St. Petersburg, Clarion Co., Pa. - Water Supply. Construction of iron removal plant and completion of water works improvements. Estimated cost - $5,000.

190. Shaler Township, Allegheny Co., Pa. - Water Supply. Extension of water supply system. Estimated cost - $226,000.

191. Shanksville, Somerset Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $20,000.

192. Sharpsburg, Allegheny Co., Pa. - Water Supply. Construction of new distribution reservoir. No cost estimate available.

193. Shippenville, Clarion Co., Pa. - Water Supply. Construction of elevated storage tank; installation of iron removal apparatus and miscellaneous improvements. Estimated cost - $6,500.

194. Sligo, Clarion Co., Pa. - Water Supply. Installation of iron removal apparatus. Estimated cost - $5,000.

195. Somerfield, Somerset Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

196. Somerset, Somerset Co., Pa. - Water Supply. Construction of a water softening plant. No cost estimate available.

197. South Fork, Cambria Co., Pa. - Water Supply. Construction of a filtration plant. Estimated cost - $40,000.

198. Spartonsburg, Crawford Co., Pa. - Water Supply. Construction of water works for fire protection. Estimated cost - $40,000.

199. Speers, Washington Co., Pa. - Water Supply. Extension of water system. Estimated cost - $30,000.

200. Sugar Grove, Warren Co., Pa. - Water Supply. Construction of a municipal water works. Estimated cost - $45,500.

201. Summit, Cambria Co., Pa. - Water Supply. Construction of water distribution system. Estimated cost - $20,000.

202. Suterville, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

203. Sygan, Allegheny Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

204. Titusville, Crawford Co., Pa. - Water Supply. Extension of water mains to Hydetown and improvements to water works. Estimated cost - $60,000.

205. Treveskyn, Allegheny Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

206. Uniontown, Fayette Co., Pa. - Water Supply. Obtain adequate supply for emergency use. No cost estimate available.

207. Vanderbilt, Fayette Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

208. Washington Township, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $10,092.

209. Waterford, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $30,000.

210. Westline, McKean Co., Pa. - Water Supply. Installation of chlorination apparatus. No cost estimate available.

211. Wilmore, Cambria Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

212. Youngstown, Westmoreland Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

## BEAVER SUB-BASIN

### GROUP I - IMMEDIATE CONSTRUCTION

POLLUTION ABATEMENT

300. Linesville, Crawford Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

301. Slippery Rock, Butler Co., Pa. - Pollution Abatement. Construction of additional units to existing sewage disposal plant. Estimated cost - $15,000.

### GROUP II - DEFERRED CONSTRUCTION

POLLUTION ABATEMENT

302. Bessemer, Lawrence Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

303. Butler Township, Butler Co., Pa. - Pollution Abatement. Extension of sanitary sewer system. Estimated cost - $3,500.

304. Jackson Township, Butler Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $10,000.

305. New Brighton, Beaver Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

306. Rochester Township, Beaver Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

307. Sharon, Mercer Co., Pa. - Pollution Abatement. Extension of sanitary sewers and the construction of additional units for the sewage disposal plant. Estimated cost - $91,800.

308. South New Castle, Lawrence Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

309. Union Township, Lawrence Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

310. West Middlesex, Mercer Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

311. White Township, Beaver Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant. No cost estimate available.

WATER SUPPLY

312. Harrisville, Butler Co., Pa. - Water Supply. Construction of a new public water supply system. Estimated cost - $39,660.

313. Slippery Rock, Butler Co., Pa. - Water Supply. Installation of a water softening plant and a filtration plant. Estimated cost - $12,000.

## GROUP III - INDETERMINATE CONSTRUCTION

### POLLUTION ABATEMENT

314. Beaver Falls, Beaver Co., Pa. - Pollution Abatement. Extension of sanitary sewers and improvements to sewage disposal plant. Estimated cost - $36,000.

315. Butler, Butler Co., Pa. - Pollution Abatement. Extension of sanitary sewers. Estimated cost - $3,500.

316. Evansburg, Butler Co., Pa. - Pollution Abatement. Extension of sanitary sewers. Estimated cost - $60,000.

317. Farrell, Mercer Co., Pa. - Pollution Abatement. Extension of sanitary sewers and the construction of a sewage disposal plant. Estimated cost - $105,000.

318. Franklin Township, Beaver Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $162,000.

319. Jackson Center, Mercer Co., Pa. - Pollution Abatement. Construction of a sewage disposal plant at school. Estimated cost - $300.

320. Linesville, Crawford Co., Pa. - Nuisance Abatement. Extension of sanitary sewer system. Estimated cost - $9,600.

321. Shenango Township, Lawrence Co., Pa. - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $13,200.

322. South New Castle, Lawrence Co., Pa. - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $45,000.

323. <u>Union Township, Lawrence Co., Pa.</u> - Nuisance Abatement. Construction of sanitary sewers. Estimated cost - $150,000.

324. <u>Wampum, Lawrence Co., Pa.</u> - Nuisance Abatement. Construction of a sanitary sewer system. Estimated cost - $25,000.

325. <u>West Pittsburgh, Lawrence Co., Pa.</u> - Nuisance Abatement. Extension of sanitary sewers. Estimated cost - $20,000.

<u>WATER SUPPLY</u>

326. <u>Ellwood City, Lawrence Co., Pa.</u> - Water Supply. Construction of lining for earthen filtered water storage reservoir. No cost estimate available.

327. <u>Evansburg, Butler Co., Pa.</u> - Water Supply. Extension of water lines, repairs to dam and pump house and changes to reservoir to increase capacity. Estimated cost - $12,000.

328. <u>Jackson Township, Butler Co., Pa.</u> - Water Supply. Construction of a public water supply system, or the extension of Zelienople system to Township. No cost estimate available.

329. <u>Mars, Butler Co., Pa.</u> - Water Supply. Completion of reservoir for public water supply. Estimated cost - $7,500.

330. <u>Meridan, Butler Co., Pa.</u> - Water Supply. Construction of a storage reservoir for fire protection. Estimated cost - $6,000.

331. New Castle, Lawrence Co., Pa. - Water Supply. Construction of a water line to the sewage disposal plant. Estimated cost - $3,416.

332. Prospect, Butler Co., Pa. - Water Supply. Construction of a public water supply system. No cost estimate available.

333. Stoneboro, Mercer Co., Pa. - Water Supply. Construction of new distribution reservoir and 1½ miles of cast iron mains. Estimated cost - $20,000.

334. Wampum, Lawrence Co., Pa. - Water Supply. Extension of water lines. Estimated cost - $5,000.

## ERIE SUB-BASIN

### GROUP I - IMMEDIATE CONSTRUCTION

400. Erie, Erie Co., Pa. - Water Supply. Construction of a water main to Presque Isle. Estimated cost - $50,000.

401. Erie, Erie Co., Pa. - Pollution Abatement. Construction of sanitary and storm sewers. Estimated cost - $787,000.

402. Erie Harbor, Erie Co., Pa. - Navigation. Dredging channels to 21 and 25 foot depths. Estimated cost - $664,000.

### GROUP II - DEFERRED CONSTRUCTION

403. Erie, Erie Co., Pa. - Pollution Abatement. Construction, extension and repairs of sanitary and storm sewers. Estimated cost - $435,000.

### GROUP III - INDETERMINATE CONSTRUCTION

POLLUTION ABATEMENT

404. Erie, Erie Co., Pa. - Pollution Abatement. Construction of sanitary and storm sewers. Estimated cost - $443,000.

405. North East, Erie Co., Pa. - Pollution Abatement. Construction of additional units for the sewage disposal plant. Estimated cost - $43,000.

406. North Girard, Erie Co., Pa. - Pollution Abatement. Construction of sanitary sewers and a sewage disposal plant. No cost estimate available.

WATER SUPPLY

407. Albion, Erie Co., Pa. - Water Supply. Construction of a pipe line and a filtration plant. Estimated cost - $98,250.

408. Cranesville, Erie Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $40,000.

409. North East, Erie Co., Pa. - Water Supply. Construction of an additional storage reservoir, mixing chamber and chemical feed at the filter plant. Estimated cost - $50,000.

410. Springboro, Crawford Co., Pa. - Water Supply. Construction of a public water supply system. Estimated cost - $22,000.

POWER

411. North East, Erie Co., Pa. - Power. Construction of a hydro-electric plant and distribution system. Estimated cost - $575,000.

# APPENDICES

Appendix A

WATER SUPPLY SYSTEMS — Upper Ohio Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities & Boro's 100,000 and Over | | | | | | |
| Pittsburgh | Allegheny | 643,505 | River & Well* | 1,440* (C)<br>600,000 (F) | Improvements | 3 Plants |
| Cities & Boro's 50,000 to 100,000 | | | | | | |
| McKeesport | Allegheny | 53,570 | River | 68,000 (F) | | |
| Johnstown | Cambria | 61,785 | Creek | 98,000 (C) | | 2 Plants |
| Cities & Boro's 25,000 to 50,000 | | | | | | |
| Wilkinsburg | Allegheny | 29,813 | Crib | 170,000 (F) | | |
| Aliquippa | Beaver | 27,115 | Well | 27,500 (C) | | 2 Plants |
| Washington | Washington | 25,515 | Creek | 35,000 (F) | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | |
| Bellevue | Allegheny | 10,589 | Well | 50,000 (F) | | |
| Braddock | Allegheny | 17,847 | River & Well | 20,500 (C) | Filter Plant | |
| Carnegie | Allegheny | 12,858 | Carrick | X (F) | | |

Type of treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
(1936) Data from "Groundwater in N. E. Penna."
X - Population served not separated for community.

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Clairton | Allegheny | 23,159 | Elizabeth | X (F) | | |
| Coraopolis | Allegheny | 13,174 | Well | 10,000 (C) | Softening Plant | |
| Dormont | Allegheny | 13,279 | Carrick | X (F) | | |
| Duquesne | Allegheny | 20,171 | Well | 21,000 (F) | | |
| Homestead | Allegheny | 18,488 | River & Wells | X(1916)(C) | | |
| McKees Rocks | Allegheny | 17,190 | Bellevue | X (F) | | |
| Munhall | Allegheny | 16,031 | Carrick | X (F) | | |
| North Braddock | Allegheny | 15,324 | Wilkinsburg | X (F) | | |
| Swissvale | Allegheny | 16,108 | Wilkinsburg | X (F) | | |
| Turtle Creek | Allegheny | 10,419 | Wilkinsburg | X (F) | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | |
| Ambridge | Beaver | 18,855 | Well | 12,800 (C) | | |
| Du Bois | Clearfield | 11,901 | Creek | 13,000 (C) | | |
| Meadville | Crawford | 16,414 | Wells | X(1916)(U) | Softening Plant | |
| Brownsville | Fayette | 10,691 | River | 14,500 (F) | | |
| Connellsville | Fayette | 13,332 | River & Creek | 18,000 (F) | | |
| Uniontown | Fayette | 20,169 | Creek | 25,000 (C) | Aux. Water Supply | |
| Indiana | Indiana | 10,411 | Creek | 12,500 (F) | | |
| Bradford | McKean | 19,084 | Creek | 19,300 (C) | Reservoir Improvement | |
| Franklin | Venango | 10,278 | Creek & Well | 12,500 | | Reservoir under Construction |
| Oil City | Venango | 21,025 | Well | 21,274 (C) | | |
| Warren | Warren | 14,830 | Well & Creek | 15,000 (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Charleroi | Washington | 11,230 | River | 40,000 (F) | | |
| Canonsburg | Washington | 12,851 | Creek | 16,000 (F) | | |
| Donora | Washington | 14,886 | Charleroi | X (F) | | |
| Arnold | Westmoreland | 10,522 | New Kensington | X (F) | | |
| Greensburg | Westmoreland | 17,072 | Creek | 27,500 (F) | | |
| Jeannette | Westmoreland | 15,014 | Greensburg | X (F) | | |
| Latrobe | Westmoreland | 10,391 | Creek | 13,000 (F) | | |
| Monessen | Westmoreland | 19,760 | Charleroi | X (F) | | |
| New Kensington | Westmoreland | 21,621 | River | 20,000 (F) | | |
| Vandergrift | Westmoreland | 10,745 | Well | 13,000 (F) | | |
| Cities & Boro's 5,000 to 10,000 | | | | | | |
| Avalon | Allegheny | 6,820 | Bellevue | X (F) | | |
| Brackenridge | Allegheny | 6,197 | River | 6,000 (F) | | |
| Brentwood | Allegheny | 7,714 | | | | |
| Crafton | Allegheny | 7,133 | Carrick | X (F) | | |
| E. Pittsburgh | Allegheny | 6,474 | Wilkinsburg | X (F) | | |
| Emsworth | Allegheny | 5,171 | Bellevue | X (F) | | |
| Etna | Allegheny | 7,991 | Well | 6,000 (C) | | |
| Forest Hills | Allegheny | 5,116 | | | | |
| Glassport | Allegheny | 8,618 | Elizabeth | X (F) | | |
| Millvale | Allegheny | 7,079 | Crib | 10,000 (C) | | |
| Mt. Oliver | Allegheny | 7,055 | Carrick | X (F) | | |
| Oakmont | Allegheny | 6,046 | River | 13,500 (F) | | |
| Pitcairn | Allegheny | 5,832 | Wilkinsburg | X (F) | | |
| Rankin | Allegheny | 7,348 | Wilkinsburg | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Sewickley | Allegheny | 5,558 | Crib | 5,000 (F) | | |
| Sharpsburg | Allegheny | 8,753 | Well | 11,000 (C) | Reservoir | |
| Tarentum | Allegheny | 10,000 | River | 10,000 (C) | | Add. Filter under Const. |
| Westview | Allegheny | 7,086 | Bellevue | X (F) | | |
| Wilmerding | Allegheny | 6,604 | Wilkinsburg | X (F) | | |
| Ford City | Armstrong | 6,117 | Well | 5,000 (F) | | |
| Kittanning | Armstrong | 7,172 | River & Spring | 7,000 (F) | | |
| Beaver | Beaver | 6,892 | Well | 4,500 (C) | Softening Plant | |
| Midland | Beaver | 6,153 | River | 7,500 (F) | | |
| Monaca | Beaver | 7,861 | Crib | 3,800 (C) | Softening & Iron Removal Plant | |
| Nanty Glo | Cambria | 6,701 | Creek & Well | 3,000 (C) | Chlorination Plant Improvement | |
| Titusville | Crawford | 7,978 | Wells | X(1916)(U) | | |
| Johnsonburg | Elk | 5,153 | Creek | 1,500 (C)<br>5,500 (F) | | 2 Plants |
| Ridgway | Elk | 2,033 | Creek | 6,400 (F) | | |
| St. Marys | Elk | 7,737 | Creek | 7,500 (C) | | |
| Corry | Erie | 6,641 | Well | 7,000 (C) | | |
| Blairsville | Indiana | 5,343 | Creek | 6,000 (C) | | |
| Punxsutawney | Jefferson | 9,287 | Creek | 10,000 (F) | | |
| Kane | McKean | 7,149 | Creek & Wells | X(1916)(U) | | |
| Somerset | Somerset | 6,224 | Well | 4,000 (C) | Softening Plant | |
| Windber | Somerset | 9,166 | Creek | 15,000 (C) | | |
| Centerville | Washington | 5,970 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served. by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Monongahela | Washington | 7,582 | River | 10,000 (F) | | |
| Parnassus | Westmoreland | 6,240 | New Kensington | X (F) | | |
| Mt. Pleasant | Westmoreland | 5,625 | Creek | 8,300 (F) | | |
| Scottdale | Westmoreland | 7,967 | Creek | 10,000 (C) | | |
| Cities & Boro's 2,500 to 5,000 | | | | | | |
| Aspinwall | Allegheny | 4,702 | Well | X(1916)(U) | | |
| Ben Avon | Allegheny | 2,806 | Bellevue | X (F) | | |
| Bridgeville | Allegheny | 4,313 | Carrick | X (F) | | |
| Castle Shannon | Allegheny | 4,008 | | | | |
| Dravosburg | Allegheny | 2,719 | Elizabeth | X (F) | | |
| East McKeesport | Allegheny | 2,832 | McKeesport | X (F) | | |
| Edgewood | Allegheny | 4,760 | Wilkinsburg | X (F) | | |
| Elizabeth | Allegheny | 2,601 | River | 22,000 (F) | | |
| Ingram | Allegheny | 4,239 | Carrick | X (F) | | |
| Leetsdale | Allegheny | 2,829 | Edgeworth | X (C) | | |
| McDonald | Allegheny | 3,520 | Creek | 9,250 (F) | | |
| Port Vue | Allegheny | 3,812 | Elizabeth | X (F) | | |
| Springdale | Allegheny | 4,541 | Well | 5,000 (F) | | |
| Trafford | Allegheny | 3,894 | Wilkinsburg | X (F) | | |
| Verona | Allegheny | 4,325 | Oakmont | X (F) | | |
| West Homestead | Allegheny | 3,776 | Homestead | X (C) | | |
| Apollo | Armstrong | 3,279 | Creek | 12,000 (F) | | |
| Freeport | Armstrong | 3,318 | River | 2,200 (F) | | |
| Leechburg | Armstrong | 4,136 | Apollo | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served. by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Freedom | Beaver | 3,058 | Eastvale | X (F) | | |
| Cresson | Cambria | 2,626 | Spring & Creek | 3,300 (C) | | 2 Plants |
| Dale | Cambria | 2,935 | Johnstown | X (C) | | |
| East Conemaugh | Cambria | 4,963 | Creek & Wells | X(1916)(F) | | |
| Ebensburg | Cambria | 3,601 | Creek & Well | 3,000 (F) | | |
| Ferndale | Cambria | 2,747 | Johnstown | X (C) | | |
| Portage | Cambria | 4,649 | Creeks | X(1916)(U) | | |
| South Fork | Cambria | 3,093 | Creek | 4,600 (C) | Filter Plant | |
| Westmont | Cambria | 3,287 | Johnstown | X (C) | | |
| Clarion | Clarion | 3,521 | Well | 2,500 (F) | | |
| Union City | Erie | 4,013 | Creek | 3,850 (C) | | |
| Masontown | Fayette | 4,583 | River | 5,000 (F) | | |
| South Connells-ville | Fayette | 2,821 | Connellsville | X (F) | | |
| Waynesburg | Greene | 4,884 | Creek | 6,500 (F) | | |
| Clymer | Indiana | 3,079 | Spring & Well | 1,500 (C) | Chlorination Plant Improve-ments | |
| Brockway | Jefferson | 2,608 | Creek | 2,369 (C) | | |
| Brookville | Jefferson | 4,350 | Creek | 3,500 (F) | Filter Plant Improvements | |
| Reynoldsville | Jefferson | 3,542 | Creek & Well | 4,100 (C) | Reservoir Improvements | |
| Coudersport | Potter | 2,824 | Spring | 1,800 (C) | Reservoir | |
| Meyersdale | Somerset | 3,247 | Creek | 4,000 (C) | | |
| Polk | Venango | 3,658 | Creek | 2,500 (F) | | State Inst. |
| Bentleyville | Washington | 3,426 | Spring & Well | 350 (C) | Extension to system | |
| Burgettstown | Washington | 2,508 | McDonald | X (F) | | |
| North Charleroi | Washington | 2,552 | Charleroi | X (F) | | |

WATER SUPPLY SYSTEMS

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Derry | Westmoreland | 2,998 | Creek | 5,500 (C) | | |
| Irwin | Westmoreland | 3,648 | Greensburg | X (F) | | |
| North Bellevernon | Westmoreland | 3,090 | Bellevernon | X (F) | | |
| South Greensburg | Westmoreland | 3,292 | Greensburg | X (F) | | |
| S. W. Greensburg | Westmoreland | 2,801 | Greensburg | X (F) | | |
| West Newton | Westmoreland | 2,815 | River | 3,400 (F) | | |
| Youngwood | Westmoreland | 2,746 | Greensburg | X (F) | | |
| Cities & Boro's 2,500 and Less | | | | | | |
| Blawnox | Allegheny | 1,941 | | | Extension | Under Constr. |
| Bradford Woods | Allegheny | 376 | | | Adequate water supply | |
| Chalfont | Allegheny | 1,239 | | | | |
| Cheswick | Allegheny | 1,269 | Wells | X(1916)(U) | | |
| Edgeworth | Allegheny | 1,803 | Well | 8,000 (C) | Public Supply | Under Constr. |
| Glenfield | Allegheny | 866 | Haysville | X (F) | | |
| Greentree | Allegheny | 1,584 | Carrick | X (F) | | |
| Haysville | Allegheny | 178 | Creek | 500 (F) | | |
| Heidelberg | Allegheny | 2,177 | Carrick | X (F) | | |
| Liberty | Allegheny | 906 | Pittsburgh | X (F) | | |
| Oakdale | Allegheny | 1,586 | Well | 1,000 (F) | Adequate water supply Purification Works | |
| Osborne | Allegheny | 528 | Haysville | X (F) | | |
| Rosslyn | Allegheny | 384 | Carrick | X (F) | | |
| Thornburg | Allegheny | 306 | Carrick | X (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Versailles | Allegheny | 2,386 | | | | |
| Wall | Allegheny | 2,229 | | | | |
| West Elizabeth | Allegheny | 1,267 | Elizabeth | X (F) | | |
| Whitaker | Allegheny | 2,006 | Carrick | X (F) | | |
| Applewold | Armstrong | 455 | Wells | X(1916)(U) | | |
| Atwood | Armstrong | 174 | | | | |
| Dayton | Armstrong | 846 | Wells | X(1936)(U) | Softening and Iron Removal Plant | |
| Elderton | Armstrong | 377 | | | | |
| Ford Cliff | Armstrong | 673 | | | | |
| Manorville | Armstrong | 682 | Spring | X(1936)(U) | | |
| North Apollo | Armstrong | 1,482 | Apollo | X (F) | | |
| Parker Landing | Armstrong | 936 | River | 1,000 (F) | Improvement to Reservoir | |
| Rural Valley | Armstrong | 786 | Wells | X(1916)(U) | | |
| South Bethlehem | Armstrong | 541 | Creek | X(1916)(U) | | |
| West Kittanning | Armstrong | 1,104 | Kittanning | X (F) | | Water Works Under Constr. |
| Worthington | Armstrong | 809 | Wells | X(1936)(U) | | |
| Baden | Beaver | 1,954 | Well | 1,200 (C) | Softening and Iron Removal Plant | |
| Bridgewater | Beaver | 1,599 | Beaver Falls | X (F) | | |
| Conway | Beaver | 1,696 | Well | 2,000 (C) | Softening and Iron Removal Plant | |
| Darlington | Beaver | 597 | | | Public Supply | |
| Frankfort Springs | Beaver | 121 | | | | |
| Georgetown | Beaver | 294 | | | | |
| Glasgow | Beaver | 283 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Hookstown | Beaver | 231 | | | | |
| New Galilee | Beaver | 431 | | | | |
| Shippingport | Beaver | 421 | | | | |
| South Heights | Beaver | 573 | Well | 500 (C) | | |
| Bruin | Butler | 634 | | | | |
| Cherry Valley | Butler | 75 | | | | |
| Eau Claire | Butler | 309 | | | | |
| Fairview | Butler | 305 | | | | |
| Karns City | Butler | 519 | | | | |
| Millerstown | Butler | 1,263 | Wells | X(1916)(U) | | |
| Petrolia | Butler | 664 | | | | |
| Saxonburg | Butler | 346 | | | | |
| Brownstown | Cambria | 1,581 | | | | |
| Cassandra | Cambria | 482 | Spring | X(1916)(U) | | |
| Daisytown | Cambria | 370 | Johnstown | X (C) | | |
| Franklin | Cambria | 2,379 | Creek & Wells | X(1916)(U) | | |
| Geistown | Cambria | 989 | | | Public Supply | |
| Lilly | Cambria | 2,334 | Creek | 2,300 (C) | | |
| Lorain | Cambria | 1,268 | | | | |
| Scalp Level | Cambria | 1,894 | Windber | X (C) | | |
| Southmont | Cambria | 2,177 | | | | |
| Summerhill | Cambria | 833 | Ehrnfield | 4,000 (C) | | |
| Vintondale | Cambria | 1,532 | Creek | 2,000 (C) | | |
| Wilmore | Cambria | 435 | | | Public Supply | |
| Callensburg | Clarion | 344 | | | | |
| Curllsville | Clarion | 205 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| East Brady | Clarion | 1,533 | Spring & Wells | X(1916)(U) | | |
| Edenburg | Clarion | 1,062 | Well | X(1916)(U) | | |
| Foxburg | Clarion | 485 | Wells | X(1916)(U) | | |
| Hawthorn | Clarion | 608 | | | | |
| New Bethlehem | Clarion | 1,625 | Creek | 1,500 (F) | | |
| Rimersburg | Clarion | 1,635 | Wells | X(1916)(U) | Extensions and Chlorination Plants | |
| Saint Petersburg | Clarion | 551 | Spring & Wells | X(1916)(U) | Treatment Plant | |
| Shippensville | Clarion | 501 | Well | X(1916)(U) | Chlorination Plant & Storage Tank | |
| Sligo | Clarion | 935 | Wells | X(1916)(U) | | |
| Strattanville | Clarion | 587 | | | Iron Removal Plant | |
| Troutville | Clearfield | 248 | | | | |
| Blooming Valley | Crawford | 182 | | | | |
| Cambridge Springs | Crawford | 1,655 | Creek | 3,500 (F) | | |
| Centerville | Crawford | 249 | | | | |
| Cochranton | Crawford | 889 | Springs | X(1916)(U) | | |
| Conneaut Lake | Crawford | 585 | Lake | 357 (C) | | |
| Geneva | Crawford | 261 | | | | |
| Hydetown | Crawford | 481 | | | | |
| Saegertown | Crawford | 648 | Wells | X(1916)(U) | | |
| Spartansburg | Crawford | 374 | | | | |
| Townville | Crawford | 300 | | | | |
| Venango | Crawford | 292 | | | | |
| Woodcock | Crawford | 100 | | | | |
| Edinboro | Erie | 921 | Well | X(1916)(U) | | |
| Elgin | Erie | 204 | | | | |
| Mill Village | Erie | 368 | | | | |

WATER SUPPLY SYSTEMS

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Waterford | Erie | 871 | Spring & Well | 750 (C) | | |
| Wattsburg | Erie | 288 | | | | |
| Bellevernon | Fayette | 2,306 | River | 5,000 (F) | | |
| Dawson | Fayette | 731 | Well | 1,500 (C) | | |
| Dunbar | Fayette | 1,378 | River | 3,500 (C) | | |
| Everson | Fayette | 1,904 | Scottdale | X (F) | | |
| Fairchance | Fayette | 2,193 | Creek | 3,500 (C) | | |
| Fayette City | Fayette | 1,410 | River & Creek | 1,500 (F) | | |
| Markleysburg | Fayette | 279 | | | | |
| Ohiopyle | Fayette | 458 | | | Public Supply | |
| Point Marion | Fayette | 2,282 | River | 3,000 (C) | | |
| Smithfield | Fayette | 799 | | | Public Supply | Under Constr. |
| Vanderbilt | Fayette | 1,036 | | | Public Supply | |
| Tionesta | Forest | 684 | Spring & Creek | 642 (C) | | |
| Carmichaels | Greene | 683 | | | Public Supply | |
| Clarksville | Greene | 596 | | | | |
| Greensboro | Greene | 535 | Spring | 75 (C) | Extensions | |
| Jefferson | Greene | 628 | | | | |
| Mount Morris | Greene | 318 | | | | |
| New Freeport | Greene | 514 | | | | |
| Rices Landing | Greene | 1,047 | | | | |
| Armagh | Indiana | 260 | | | | |
| Creekside | Indiana | 604 | Springs | X(1916)(U) | | |
| Homer City | Indiana | 2,119 | Creek | 4,350 (F) | | |
| Jacksonville | Indiana | 219 | | | | |
| Marion Center | Indiana | 509 | Spring | X(1916)(U) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Plumville | Indiana | 586 | | | Public Supply | |
| Saltsburg | Indiana | 1,061 | River | 900 (F) | | |
| Shelocta | Indiana | 114 | | | | |
| Smicksburg | Indiana | 235 | | | | |
| Big Run | Jefferson | 864 | Punxsutawney | X (F) | | |
| Corsica | Jefferson | 411 | | | Public Supply | |
| Falls Creek | Jefferson | 1,441 | Creek | 1,350 (F) | Additions to Plant | |
| Sumerville | Jefferson | 1,065 | Wells & Springs | X(1916)(U) | | |
| Sykesville | Jefferson | 2,006 | Creek & Wells | X(1916)(U) | Water Works | Under Constr. |
| Timblin | Jefferson | 474 | | | | |
| Worthville | Jefferson | 99 | | | | |
| Enon Valley | Lawrence | 380 | | | | |
| Eldred | McKean | 1,107 | Springs & Well | X(1916)(U) | Reservoir | |
| Lewis Run | McKean | 833 | Creek | 200 (C) | | |
| Mount Jewett | McKean | 1,366 | Spring & Well | X(1916)(U) | | |
| Port Allegheny | McKean | 2,140 | Creek | 2,200 (C) | | |
| Smethport | McKean | 1,652 | Creek & Well | 1,800 (C) | | |
| New Lebanon | Mercer | 222 | | | | |
| Sandy Lake | Mercer | 753 | Springs | X(1916)(U) | | |
| Sheakleyville | Mercer | 99 | | | | |
| Oswayo | Potter | 188 | Springs | X(1916)(U) | | |
| Shinglehouse | Potter | 1,265 | Springs | X(1916)(U) | | |
| Addison | Somerset | 190 | | | | |
| Benson | Somerset | 405 | Springs | X(1916)(U) | Public Supply | |
| Berlin | Somerset | 1,387 | Springs | X(1916)(U) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Boswell | Somerset | 1,742 | Creek & Well | 1,000 (C) | Filter Plant | |
| Casselman | Somerset | 141 | | | | |
| Central City | Somerset | 2,166 | Creek | 3,400 (C) | Filter Plant | |
| Confluence | Somerset | 1,228 | Creek | 1,250 (C) | | |
| Garrett | Somerset | 947 | Creek | 1,200 (C) | | |
| Hooversville | Somerset | 1,417 | Creek | 1,500 (C) | | |
| Jennerstown | Somerset | 290 | | | | |
| New Centerville | Somerset | 149 | | | | |
| Paint | Somerset | 1,348 | Windber | X (C) | | |
| Rockwood | Somerset | 1,324 | Creek & Well | 1,600 (C) | | |
| Salisbury | Somerset | 745 | | | Public Supply | |
| Shanksville | Somerset | 337 | | | Public Supply | |
| Somerfield | Somerset | 157 | | | Public Supply | |
| Stoystown | Somerset | 488 | Well | 500 (C) | | |
| Ursina | Somerset | 299 | Spring | X(1916)(U) | | |
| Clintonville | Venango | 331 | | | | |
| Cooperstown | Venango | 198 | | | | |
| Emlenton | Venango | 1,252 | River | 950 (F) | | |
| Pleasantville | Venango | 797 | Wells | X(1916)(U) | | |
| Rouseville | Venango | 1,125 | Springs & Wells | X(1916)(U) | | |
| Utica | Venango | 200 | | | | |
| Clarendon | Warren | 860 | Wells | X(1916)(U) | | |
| Grand Valley | Warren | 325 | Springs | X(1916)(U) | | |
| Bear Lake | Warren | 191 | | | | |
| Sugar Grove | Warren | 463 | | | | |
| Tidioute | Warren | 980 | Creek | 1,063 (C) | | |
| Youngsville | Warren | 1,926 | Wells | X(1916)(U) | | |
| Allenport | Washington | 1,126 | Well | 2,000 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Beallsville | Washington | 654 | | | Public Supply | |
| California | Washington | 2,427 | River | 5,000 (F) | | |
| Claysville | Washington | 937 | Creek | 1,000 (F) | | |
| Coal Center | Washington | 625 | | | Public Supply | |
| Cokeburg | Washington | 1,358 | Creek | 1,600 (F) | | |
| Deemston | Washington | 630 | | | | |
| Dunlevy | Washington | 549 | | | | |
| East Washington | Washington | 1,822 | Washington | X (F) | | |
| Elco | Washington | 653 | | | | |
| Ellsworth | Washington | 1,909 | Creek | 2,000 (F) | | |
| Finleyville | Washington | 657 | | | Public Supply | |
| Houston | Washington | 1,775 | | | | |
| Long Branch | Washington | 233 | | | | |
| Marianna | Washington | 1,725 | Creek | 1,500 (F) | | |
| Midway | Washington | 1,037 | | | Public Supply | |
| New Eagle | Washington | 1,684 | Monongahela | X (F) | | |
| Roscoe | Washington | 1,304 | | | | |
| Speers | Washington | 671 | | | | |
| Stockdale | Washington | 762 | | | | |
| Twilight | Washington | 230 | | | | |
| West Alexander | Washington | 490 | | | | |
| West Middletown | Washington | 332 | | | | |
| Adamsburg | Westmoreland | 252 | | | | |
| Arona | Westmoreland | 549 | | | | |
| Avonmore | Westmoreland | 1,229 | Well | 1,300 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Bolivar | Westmoreland | 708 | Creek | 2,000 (C) | Filter Plant | |
| Donegal | Westmoreland | 203 | | | | |
| East Vandergrift | Westmoreland | 2,270 | Vandergrift | X (F) | | |
| Export | Westmoreland | 2,223 | Creek | X(1916)(U) | Public Supply | |
| Hunkers | Westmoreland | 381 | | | | |
| Hyde Park | Westmoreland | 749 | | | | |
| Ligonier | Westmoreland | 2,250 | Creek | X(1916)(U) | Filter Plant | |
| Livermore | Westmoreland | 250 | | | | |
| Madison | Westmoreland | 377 | | | | |
| Manor | Westmoreland | 1,342 | Greensburg | X (F) | | |
| New Alexandria | Westmoreland | 624 | | | Public Supply | |
| New Florence | Westmoreland | 856 | Creek | X(1916)(U) | Chlorination Plant | |
| New Salem | Westmoreland | 956 | Greensburg | X (F) | | |
| Penn | Westmoreland | 1,014 | Greensburg | X (F) | | |
| North Irwin | Westmoreland | 1,105 | Greensburg | X (F) | | |
| Seward | Westmoreland | 925 | | | | |
| Smithton | Westmoreland | 703 | | | | |
| Suterville | Westmoreland | 871 | | | Public Supply | |
| West Leechburg | Westmoreland | 1,051 | | | | |
| Youngstown | Westmoreland | 523 | Apollo | X (F) | Public Supply | |
| Unincorporated Towns and Villages | | | | | | |
| Allison Park | Allegheny | 828 | Well | X(1916)(U) | Extension Plant | |
| Bairdford | Allegheny | 1,000 | | | | |
| Banksville | Allegheny | 1,400 | | | | |
| Blythedale | Allegheny | 1,000 | | | | |
| Boston | Allegheny | 600 | | | | |
| Bower Hill | Allegheny | 500 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Broughton | Allegheny | 2,200 | | | | |
| Buena Vista | Allegheny | 600 | | | | |
| Bunola | Allegheny | 500 | | | | |
| Carnot | Allegheny | 500 | | | | |
| Carrick | Allegheny | 8,305 | River | 200,000 (F) | | |
| Center | Allegheny | 500 | | | | |
| Cuddy | Allegheny | 800 | | | Public Supply | |
| Curtisville | Allegheny | 1,800 | | | | |
| Edgewood Acres | Allegheny | 600 | | | | |
| Elwyn | Allegheny | 500 | | | | |
| Fair Oaks | Allegheny | 1,100 | Wells | X(1916)(U) | | |
| Gallatin | Allegheny | 900 | | | | |
| Glassmere | Allegheny | 1,900 | River | X(1916)(U) | | |
| Glen | Allegheny | 2,130 | | | | |
| Glendale | Allegheny | 2,500 | | | | |
| Glenshaw | Allegheny | 500 | | | | |
| Glenwillard | Allegheny | 650 | | | | |
| Greenock | Allegheny | 800 | | | | |
| Groveton | Allegheny | 800 | | | | |
| Harwick | Allegheny | 1,150 | Well | 1,500 (C) | | |
| Hays | Allegheny | 2,331 | River | X(1916)(U) | | |
| Hickman | Allegheny | 525 | | | | |
| Idlewood | Allegheny | 650 | | | | |
| Imperial | Allegheny | 819 | | | | |
| Indianola | Allegheny | 532 | Well | 500 (C) | | |
| Ingomar | Allegheny | 3,000 | | | | |
| Kennywood Park | Allegheny | 500 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Library | Allegheny | 1,115 | | 2,000 (F) | Public Supply | |
| Lincoln Place | Allegheny | 1,026 | | | | |
| Linhart | Allegheny | 500 | | | | |
| Long Run | Allegheny | 500 | | | | |
| Mollinauer | Allegheny | 700 | | | | |
| Moon Run | Allegheny | 1,267 | Well | 900 (C) | | |
| Morgan | Allegheny | 1,000 | | | | |
| Natrona | Allegheny | 7,200 | River | 12,000 (F) | | |
| Noblestown | Allegheny | 600 | | | | |
| North Star | Allegheny | 750 | | | | |
| North Star Junction | Allegheny | 524 | | | | |
| Oak Hill | | 1,200 | | | | |
| Perrysville | Allegheny | 1,000 | | | | |
| Port Perry | Allegheny | 1,031 | | | | |
| Preston | Allegheny | 2,000 | Well | 5,000 (C) | | |
| Redman Mills | Allegheny | 515 | | | | |
| Rural Ridge | Allegheny | 700 | | | | |
| Russellton | Allegheny | 4,000 | Creek | 1,600 (F) | Add. Emergency Supply | |
| Smithdale | Allegheny | 625 | River | 500 (F) | | |
| Sygan | Allegheny | 500 | | | Public Supply | |
| Terrace | Allegheny | 500 | | | | |
| Treveskyn | Allegheny | 800 | | | Public Supply | |
| Tyre | Allegheny | 750 | | | | |
| Unity | Allegheny | 700 | River | X(1916)(U) | | |
| Universal | Allegheny | 810 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Warrendale | Allegheny | 500 | | | | |
| Wilson | Allegheny | 3,243 | | | | |
| Wolfton | Allegheny | 3,000 | | | | |
| Woodville | Allegheny | 4,000 | Well | 1,200 (F) | | |
| Bradys Bend | Armstrong | 800 | | | | |
| Margaret | Armstrong | 500 | | | | |
| McGrann | Armstrong | 500 | | | | |
| Oak Ridge | Armstrong | 500 | | | | |
| Sagamore | Armstrong | 1,750 | Well | X(1916)(U) | | |
| Seminole | Armstrong | 500 | | | | |
| Templeton | Armstrong | 1,000 | | | | |
| Yatesboro | Armstrong | 2,067 | Wells | X(1916)(U) | | |
| College Hill | Beaver | 2,643 | River | X(1916)(U) | | |
| New Sheffield | Beaver | 1,500 | Wells | X(1916)(U) | | |
| Vanport | Beaver | 875 | | | | |
| West Aliquippa | Beaver | 2,931 | | | | |
| Cabot | Butler | 500 | | | | |
| Sarver | Butler | 530 | | | | |
| Beaverdale | Cambria | 1,643 | Creek | X(1916)(U) | | |
| Cardiff | Cambria | 500 | | | | |
| Colver | Cambria | 1,800 | Creek & Well | 1,200 (C) | Filter Plant | |
| Dunlo | Cambria | 2,000 | | | | |
| Eastmont | Cambria | 500 | | | | |
| Ehrenfield | Cambria | 1,100 | Creek & Well | 4,000 (C) | | |
| Llanfair | Cambria | 500 | | | | |
| Lloydell | Cambria | 875 | River | X(1916)(U) | | |

WATER SUPPLY SYSTEMS

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Nettleton | Cambria | 500 | | | | |
| Parkhill | Cambria | 700 | | | | |
| Revloc | Cambria | 526 | | | | |
| Sonman | Cambria | 150 | | | | |
| Saint Michael | Cambria | 521 | | | | |
| Twin Rocks | Cambria | 1,541 | | | | |
| Fairmount City | Clarion | 500 | | | | |
| West Monterey | Clarion | 610 | | | | |
| Helvetia | Clearfield | 500 | | | | |
| Fredericksburg | Crawford | 500 | | | | |
| Dagus Mines | Elk | 1,500 | | | | |
| Durant City | Elk | 1,000 | | | | |
| Eagle Valley | Elk | 500 | | | | |
| Gillen | Elk | 700 | | | | |
| West Ridgway | Elk | 1,000 | | | | |
| Wilcox | Elk | 900 | | | | |
| Adelaide | Fayette | 550 | River | X(1916)(U) | | |
| Alica | Fayette | 500 | | | | |
| Allison | Fayette | 1,200 | River & Creek | 2,500 (F) | | |
| Antram | Fayette | 1,200 | | | | |
| Arnold City | Fayette | 500 | Wells | X(1916)(U) | | |
| Brownfield | Fayette | 1,521 | River | X(1916)(U) | | |
| Bute | Fayette | 1,000 | River | X(1916)(U) | | |
| Cardale | Fayette | 750 | | | | |
| Chestnut Ridge | Fayette | 775 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| East Connellsville | Fayette | 500 | | | | |
| Edinborn Junction | Fayette | 1,224 | | | | |
| Fairbank | Fayette | 500 | | | | |
| Footdale | Fayette | 500 | River | X(1916)(U) | | |
| Gates | Fayette | 1,200 | River | X(1916)(U) | | |
| Gillespie | Fayette | 500 | | | | |
| Griffin | Fayette | 500 | | | | |
| Grindstone | Fayette | 528 | | | | |
| Hopwood | Fayette | 821 | | | | |
| Juniata | Fayette | 1,410 | River | X(1916)(U) | | |
| Kifertown | Fayette | 600 | Creek | X(1916)(U) | | |
| Lake Lynn | Fayette | 500 | | | | |
| Lambert | Fayette | 600 | Rivers | X(1916)(U) | | |
| Lamberton | Fayette | 600 | | | | |
| LaBelle | Fayette | 1,025 | | | | |
| Leckrone | Fayette | 700 | River | X(1916)(U) | | |
| Leisenring | Fayette | 850 | River | X(1916)(U) | | |
| Martin | Fayette | 1,256 | Spring & River | 425 (C) | | |
| Maxwell | Fayette | 1,200 | River | 900 (F) | | |
| Melcroft | Fayette | 500 | | | | |
| McClellandtown | Fayette | 821 | | | | |
| Monarch | Fayette | 700 | River | X(1916)(U) | | |
| Mount Braddock | Fayette | 800 | River | X(1916)(U) | | |
| Newcomer | Fayette | 700 | River | X(1916)(U) | | |
| New Salem | Fayette | 900 | River | 18,000 (F) | | |
| Newell | Fayette | 1,200 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Oliphant Furnace | Fayette | 500 | River | X(1916)(U) | | |
| Oliver | Fayette | 1,057 | River | X(1916)(U) | | |
| Orient | Fayette | 1,625 | River | X(1916)(U) | | |
| Perryopolis | Fayette | 825 | | | Public Supply | |
| Filbert | Fayette | 900 | River | X(1916)(U) | | |
| Republic | Fayette | 2,500 | River | X(1916)(U) | | |
| Ronco | Fayette | 1,054 | River | X(1916)(U) | | |
| Rowes Run | Fayette | 2,000 | | | | |
| Smock | Fayette | 1,036 | Creek | 9,000 (F) | | |
| Star Junction | Fayette | 3,055 | Creek | 1,350 (F) | | |
| Trotter | Fayette | 950 | Rivers | X(1916)(U) | | |
| Waltersburg | Fayette | 550 | | | | |
| Washington Mines | Fayette | 1,300 | | | | |
| Whitsett | Fayette | 750 | River | 750 (F) | | |
| York Run | Fayette | 1,627 | Rivers | X(1916)(U) | | |
| Brookston | Forest | 517 | | | | |
| Kellettville | Forest | 839 | | | | |
| Marienville | Forest | 700 | Springs & Wells | X(1916)(U) | | |
| Bobtown | Greene | 2,000 | Creek | 1,000 (F) | | |
| Brave | Greene | 641 | Creek & River | 200 (F) | | |
| Crucible | Greene | 1,800 | | | | |
| Mather | Greene | 2,500 | Creek | 900 (F) | | |
| Nemacolin | Greene | 2,600 | Well | 3,000 (C) | | |
| Penna. Furnace | Huntingdon | 500 | | | | |
| Arcadia | Indiana | 500 | Springs | X(1916)(U) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Commodore | Indiana | 800 | Creek | 700 (C) | | |
| Coral | Indiana | 725 | Creeks | X(1916)(U) | | |
| Dixonville | Indiana | 1,500 | | | | |
| Earnest | Indiana | 1,500 | Creek | 1,400 (F) | | |
| Edri | Indiana | 515 | | | | |
| Graceton | Indiana | 500 | Wells | X(1916)(U) | | |
| Heilwood | Indiana | 1,000 | | | | |
| Iselin | Indiana | 2,050 | Well | X(1916)(U) | | |
| Josephine | Indiana | 500 | Well | X(1916)(U) | | |
| Lucerne Mines | Indiana | 1,200 | Creek | X(1916)(U) | | |
| McIntyre | Indiana | 600 | Well | 700 (C) | | |
| Mowrytown | Indiana | 815 | | | | |
| Robinson | Indiana | 900 | | | | |
| Rossiter | Indiana | 2,000 | Well & Creek | 1,400 (F) | | |
| Sides | Indiana | 500 | | | | |
| Wallopsburg | Indiana | 515 | | | | |
| Wehrun | Indiana | 619 | Creek | X(1916)(U) | | |
| Anita | Jefferson | 1,000 | | | | |
| Conifer | Jefferson | 1,224 | Wells | X(1916)(U) | | |
| Corner | Jefferson | 620 | | | | |
| Crenshaw | Jefferson | 500 | Creek | X(1916)(U) | | |
| Sigel | Jefferson | 950 | | | | |
| Valier | Jefferson | 500 | | | | |
| Westville | Jefferson | 538 | | | | |
| Cyclone (Simpson) | McKean | 750 | | | Public Supply | |
| Duke Center | McKean | 1,200 | | | | |
| East Kane | McKean | 600 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Hazel Hurst | McKean | 650 | Creeks & Spring | X(1916)(U) | Chlorination Plant | |
| Ludlow | McKean | 1,400 | Springs | X(1916)(U) | | |
| Rixford | McKean | 518 | | | | |
| Roulette | Potter | 500 | Creek | X(1916)(U) | | |
| Cairnbrook | Somerset | 1,500 | Well | 900 (F) | | |
| Foustwell | Somerset | 700 | Well | 280 (F) | | |
| Gray | Somerset | 800 | | | | |
| Holsopple | Somerset | 1,100 | Well | 125 (F) | | |
| Jenners | Somerset | 1,500 | Well | 2,000 (F) | | |
| Jerome | Somerset | 1,032 | Creek | 1,600 (F) | | |
| Listie | Somerset | 650 | | | | |
| MacDonaldton | Somerset | 1,035 | | | | |
| Quecreek | Somerset | 600 | | | | |
| Ralphton | Somerset | 600 | Creek | 500 (C) | Distribution Reservoir and Improvements | |
| Seanor | Somerset | 500 | Creek | X(1916)(U) | | |
| Thomas Mills | Somerset | 600 | | | | |
| Bullion | Venango | 500 | | | | |
| Reno | Venango | 800 | Springs & Wells | X(1916)(U) | | |
| Rockygrove | Venango | 1,065 | | | | |
| Akeley | Warren | 585 | | | | |
| North Warren | Warren | 900 | | | Public Supply | |
| Russell | Warren | 500 | | | | |
| Sheffield | Warren | 2,500 | Well, Spring and Creek | 1,200 (C) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Anderson | Washington | 512 | | | | |
| Atlasburg | Washington | 600 | | | | |
| Avella | Washington | 3,000 | Creek | 2,200 (F) | Reservoir Improvements | |
| Blainsburg | Washington | 1,000 | | | | |
| Bulger | Washington | 500 | | | | |
| Catsburg | Washington | 2,000 | | | | |
| Cherry Valley | Washington | 1,425 | | | | |
| Coal Bluff | Washington | 526 | | | | |
| Courtney | Washington | 617 | | | | |
| Daisytown | Washington | 1,500 | Creek | X(1916)(U) | | |
| Elrama | Washington | 1,500 | | | | |
| Fredericktown | Washington | 1,050 | River | 2,500 (F) | | |
| Frye (Ivanhoe) | Washington | 513 | | | | |
| Gastonville | Washington | 500 | | | | |
| Hackett | Washington | 525 | | | | |
| Hickory | Washington | 600 | | | | |
| Hills | Washington | 1,400 | | | | |
| Joffre | Washington | 750 | | | | |
| Lawrence | Washington | 1,400 | | | | |
| Lock No. 4 | Washington | 618 | | | | |
| Langeloth | Washington | 1,300 | Creek | 2,000 (F) | | |
| Meadow Lands | Washington | 2,025 | | | | |
| Millsboro | Washington | 1,536 | | | | |
| Morganza | Washington | 1,500 | Creek | 900 (F) | | |
| Muse | Washington | 2,000 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Penowa | Washington | 1,187 | | | | |
| Richeyville | Washington | 1,600 | Creek & Spring | 1,000 (F) | | |
| Richfol | Washington | 2,300 | | | | |
| Slovan | Washington | 1,800 | | | | |
| Southview | Washington | 500 | | | | |
| Strabane | Washington | 1,700 | | | | |
| Tylerdale | Washington | 1,580 | | | | |
| Van Voorhis | Washington | 800 | Spring | 850 (C) | | |
| Vestaburg | Washington | 1,062 | River | 2,500 (F) | | |
| West Brownsville Junction | Washington | 500 | | | | |
| Westland | Washington | 800 | | | | |
| West | Monessen | 618 | | | | |
| Wolfdale | Washington | 550 | | | | |
| Acme | Westmoreland | 1,300 | Creek | X(1916)(U) | | |
| Alverton | Westmoreland | 500 | | | | |
| Baggaley | Westmoreland | 1,050 | Creek | 250 (C) | | |
| Bradenville | Westmoreland | 1,400 | Creek | X(1916)(U) | | |
| Braeburn | Westmoreland | 1,300 | | | | |
| Carpentertown | Westmoreland | 518 | | | | |
| Claridge | Westmoreland | 1,200 | | | | |
| Cokeville | Westmoreland | 540 | | | | |
| Crabtree | Westmoreland | 1,106 | | | | |
| Crows Nest | Westmoreland | 500 | | | | |
| Delmont | Westmoreland | 721 | | | Public Supply | |
| Forbes Road | Westmoreland | 695 | | | | |
| Grapeville | Westmoreland | 1,200 | | | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Guffey | Westmoreland | 612 | | | | |
| Hahntown | Westmoreland | 514 | | | | |
| Hannastown | Westmoreland | 950 | | | | |
| Harrison City | Westmoreland | 500 | | | Public Supply | |
| Haydenville | Westmoreland | 518 | | | | |
| Hecla | Westmoreland | 3,000 | Creek | X(1916)(U) | | |
| Herminie | Westmoreland | 2,500 | Spring | (Private)600 (C) | Public Supply | |
| Hostetter | Westmoreland | 948 | Creek | X(1916)(U) | | |
| Huffs Station | Westmoreland | 675 | | | | |
| Humphrey | Westmoreland | 600 | | | | |
| Jacobs Creek | Westmoreland | 550 | River | 600 (F) | | |
| Larimer | Westmoreland | 1,527 | | | | |
| Lowber | Westmoreland | 718 | | | | |
| Lusk | Westmoreland | 515 | | | | |
| Luxor | Westmoreland | 725 | Creek | 3,500 (C) | | |
| Marguerite | Westmoreland | 600 | | | | |
| Morewood | Westmoreland | 500 | Creek | X(1916)(U) | | |
| Murraysville | Westmoreland | 800 | | | Public Supply | |
| Mutual | Westmoreland | 810 | | | | |
| New Derry | Westmoreland | 550 | | | | |
| Oceanco | Westmoreland | 500 | | | | |
| Pershing | Westmoreland | 1,000 | Creek | X(1916)(U) | | |
| Pleasant Unity | Westmoreland | 800 | Creek | X(1916)(U) | | |
| Pricedale | Westmoreland | 1,036 | River | X(1916)(U) | | |
| Loyalhanna | Westmoreland | 800 | Creek | X(1916)(U) | | |
| Ruffs Dale | Westmoreland | 500 | | | | |
| Salina | Westmoreland | 1,200 | | | Adequate Supply | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Scott Haven | Westmoreland | 500 | | | | |
| Shafton | Westmoreland | 800 | | | | |
| Slickville | Westmoreland | 1,200 | | | | |
| Somers | Westmoreland | 1,036 | | | | |
| Southwest | Westmoreland | 3,000 | | | | |
| Standard | Westmoreland | 3,053 | Creek | X(1916)(U) | | |
| Swedetown | Westmoreland | 800 | | | | |
| Torrance | Westmoreland | 500 | Creek | 675 (C) | | |
| United | Westmoreland | 716 | Creek | X(1916)(U) | | |
| Van Meter | Westmoreland | 750 | | | | |
| Wendel | Westmoreland | 700 | Creek & Spring | 1,000 (F) | | |
| West Side | Westmoreland | 600 | | | | |
| Whitney | Westmoreland | 925 | Creek | 1,400 (C) | | |
| Wilpen | Westmoreland | 710 | | | | |
| Wyano | Westmoreland | 1,400 | | | | |
| Yukon | Westmoreland | 2,000 | | | | |

Appendix A

WATER SUPPLY SYSTEMS — Beaver Sub-Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities | | | | | | |
| 25,000 to 50,000 | | | | | | |
| New Castle | Lawrence | 46,695 | River | 44,000 (F) | | |
| Sharon | Mercer | 25,446 | River | 45,000 (F) | | |
| Butler | Butler | 28,527 | Creek | 32,200 (F) | | |
| Cities & Boro's | | | | | | |
| 10,000 to 25,000 | | | | | | |
| Beaver Falls | Beaver | 16,284 | Eastvale | X (F) | | |
| Ellwood City | Lawrence | 12,832 | Creek | 8,500 (F) | Reservoir Improvements | |
| Farrell | Mercer | 13,480 | Sharon | X (F) | | |
| Cities & Boro's | | | | | | |
| 5,000 to 10,000 | | | | | | |
| New Brighton | Beaver | 9,451 | Eastvale | X (F) | | |
| Rochester | Beaver | 7,700 | Eastvale | X (F) | | |
| Greenville | Mercer | 9,566 | River & Creek | 9,500 (F) | | |
| Grove City | Mercer | 6,529 | Well | 7,000 (F) | | |
| Sharpsville | Mercer | 5,331 | Well | 4,670 (C) | | |

Type of treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
(1936) Data from "Groundwater in N. E. Penna."
X - Population served not separated for community.

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities & Boro's 2,500 and Less | | | | | | |
| East Rochester | Beaver | 773 | Eastvale | X (F) | | |
| Eastvale | Beaver | 601 | River | 55,000 (F) | | Serves Beaver Valley Towns |
| Fallston | Beaver | 578 | Eastvale | X (F) | | |
| Homewood | Beaver | 320 | | | | |
| Koppel | Beaver | 947 | Creek | X(1916)(U) | | |
| Patterson Heights | Beaver | 632 | Eastvale | X (F) | | |
| West Mayfield | Beaver | 951 | | | | |
| Callery | Butler | 307 | | | | |
| Connoquenessing | Butler | 512 | | | | |
| East Butler | Butler | 515 | Wells | X(1916)(U) | | |
| Evansburg | Butler | 1,596 | Creek & Well | 1,400 (F) | | |
| Harmony | Butler | 1,006 | | | | |
| Harrisville | Butler | 611 | | | Public Supply | |
| Mars | Butler | 1,350 | Well | 1,226 (C) | | |
| Portersville | Butler | 343 | | | | |
| Prospect | Butler | 528 | | | Public Supply | |
| Slippery Rock | Butler | 1,431 | | X(1916)(U) | Softening & Iron Removal Plant | |
| Valencia | Butler | 303 | | | | |
| West Liberty | Butler | 188 | | | | |
| West Sunbury | Butler | 254 | | | | |
| Zelienople | Butler | 2,415 | Creek | 1,900 (F) | | |
| Linesville | Crawford | 1,008 | Springs | X(1916)(U) | | |
| Bessemer | Lawrence | 1,681 | Well | 400 (F) | | |

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Ellport | Lawrence | 1,050 | | | | |
| New Wilmington | Lawrence | 1,041 | Well | 386 (C) | | |
| South New Castle | Lawrence | 1,094 | | | | |
| Volant | Lawrence | 209 | Springs | X(1916)(U) | | |
| Wampum | Lawrence | 781 | Springs | X(1916)(U) | | |
| Clarksville | Mercer | 261 | | | | |
| Fredonia | Mercer | 559 | | | | |
| Jackson Center | Mercer | 378 | | | | |
| Jamestown | Mercer | 750 | Spring & Well | 700 (C) | | |
| Mercer | Mercer | 2,455 | Creek | 1,850 (F) | | |
| Stoneboro | Mercer | 1,332 | Springs | X(1916)(U) | Reservoir and Extensions | |
| West Middlesex | Mercer | 1,261 | Well | X(1916)(U) | | |
| Wheatland | Mercer | 1,531 | Sharon | X (F) | | |
| Unincorporated Towns and Villages 500 or Over | | | | | | |
| College Hill | Beaver | 2,643 | Eastvale | X (F) | | |
| Erico | Butler | 520 | | | | |
| Lyndora | Butler | 3,057 | Creek | X(1916)(U) | | |
| Renfrew | Butler | 518 | | | | |
| Edinburg | Lawrence | 650 | | | | |
| Hillsville | Lawrence | 2,000 | | | | |
| Mahoningtown | Lawrence | 4,800 | | | | |
| Mount Jackson | Lawrence | 700 | | | | |
| Neshannock Falls | Lawrence | 537 | | | | |
| Rigby | Lawrence | 1,000 | | | | |
| West Pittsburgh | Lawrence | 700 | River | 1,000 (F) | | |

WATER SUPPLY SYSTEMS

Lake Erie Basin

| Civil Sub-Division | County | Estimated 1934 Population | Source of Water Supply | Pop. Served by Water Co's. and Type of Treatment | Needs | Remarks |
|---|---|---|---|---|---|---|
| Cities over 100,000 | | | | | | |
| Erie | Erie | 108,093 | Lake | 125,000 (F) | | 2 Plants |
| Boro's 2,500 to 5,000 | | | | | | |
| North East | Erie | 3,814 | Creek | 3,650 (F) | Reservoir Improvement | |
| Wesleyville | Erie | 2,994 | Erie | X (F) | | |
| Boro's 2,500 and Less | | | | | | |
| Conneautville | Crawford | 936 | Well & Spring | 900 (C) | | |
| Springboro | Crawford | 509 | | | Public Supply | |
| Albion | Erie | 1,842 | Well & Spring | X(1916)(U) | | |
| Cranesville | Erie | 632 | | | | |
| East Springfield | Erie | 441 | | | | |
| Fairview | Erie | 514 | | | | |
| Girard | Erie | 2,382 | Well & Spring | X(1916)(U) | | |
| Middleboro | Erie | 389 | | | | |
| North Girard (Inc. Girard Twp) | Erie | 1,077 | | | Public Supply | Under Const. |
| Platea | Erie | 244 | | | | |

Type of treatment: - (C) - Chlorination
(F) - Filtered
(U) - Untreated

(1916) Data from Water Resources Inventory Report 1916.
(1936) Data from "Groundwater in N. E. Penna."
X - Population served not separated for community

APPENDIX B

SEWAGE DISPOSAL SYSTEMS

Upper Ohio Basin

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| | | | * | ** | | | |
| Cities & Boro's 100,000 & Over | | | | | | | |
| Pittsburgh | Allegheny | 643,505 | X | X | Add. Sewers, Treat. Plt., Pumping Sta. Collectors | | |
| Cities & Boro's 50,000 to 100,000 | | | | | | | |
| McKeesport | Allegheny | 53,570 | X | | Add. Sewers | Project Pending | Group 8 |
| Johnstown | Cambria | 61,785 | X | | Disposal Plt. | | Dale, E. Conemaugh Fern Dale, Franklin, Southmont Westmont, Lower Yoder & Stony Creek |
| Cities & Boro's 25,000 to 50,000 | | | | | | | |
| Wilkinsburg | Allegheny | 29,813 | X | | | | Group 10 |
| Aliquippa | Beaver | 27,115 | X | | San. Sewers | | |
| Washington | Washington | 25,515 | X | X | San. Sewers & Disposal Plt. Repairs | | |

* Existing public sewers designated by X. ** Existing sewage treatment plant designated by X.

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Cities & Boro's 10,000 to 25,000 | | | | | | | |
| Bellevue | Allegheny | 10,589 | X | | | | Group 1 |
| Braddock | Allegheny | 17,847 | X | | | | Group 6 |
| Carnegie | Allegheny | 12,858 | | | San. Sewers | | Group 4 |
| Clarion | Allegheny | 23,159 | X | X | Add. San. Sewers & Disposal Plant | | |
| Coraopolis | Allegheny | 13,174 | X | | Ext. of Sewers | | |
| Dormont | Allegheny | 13,279 | X | | | Treat. at Brentwood | Group 2 |
| Duquesne | Allegheny | 20,171 | | | | | Group 3 |
| Homestead | Allegheny | 18,488 | X | | | Treat. at Brentwood | Group 2 |
| McKees Rocks | Allegheny | 17,190 | X | | | | Group 4 |
| Munhall | Allegheny | 16,031 | | | | | Group 3 |
| North Braddock | Allegheny | 15,824 | X | | | | Group 6-7 |
| Swissvale | Allegheny | 16,108 | X | | | | Group 6-10 |
| Turtle Creek | Allegheny | 10,419 | X | | | | Group 7 |
| Ambridge | Beaver | 18,855 | X | | | | Baden-Harmony |
| DuBois | Clearfield | 11,901 | X | | Add. Sewers | | |
| Meadville | Crawford | 16,414 | X | | San. Sewers | | |
| Brownsville | Fayette | 10,691 | X | | San. Sewers | | |
| Connellsville | Fayette | 13,332 | X | | Intercepting Sewers, Disposal Plant | | |

SEWAGE DISPOSAL SYSTEMS

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Uniontown | Fayette | 20,169 | X | | San. Sewers | | |
| Indiana | Indiana | 10,411 | X | X | | | |
| Bradford | McKean | 19,084 | X | | | | |
| Franklin | Venango | 10,278 | X | | Intercepting Sewer, Disposal Plt. & Sewers | Order Issued | Sugar Creek Twp. |
| Oil City | Venango | 21,025 | X | | Intercepting Sewers, Disposal Plant & Combined Sewers | Order Issued | |
| Warren | Warren | 14,830 | X | | Disposal Plant | Order Issued | |
| Charleroi | Washington | 11,230 | X | | Intercepting Sewers | | |
| Canonsburg | Washington | 12,851 | | | | | |
| Donora | Washington | 14,886 | | | | | |
| Arnold | Westmoreland | 10,522 | X | | Combined Sewers at Valley Camp | | |
| Greensburg | Westmoreland | 17,072 | X | | Intercepting Sewer & Disposal Plant | | |
| Jeannette | Westmoreland | 15,014 | | | Sewer Ext., Interceptor & Dis. Plt. | Under Const. | |
| Latrobe | Westmoreland | 10,391 | X | | Sewer Ext. & Disposal Plt. | | |
| Monessen | Westmoreland | 19,760 | | | | | |
| New Kensington | Westmoreland | 21,621 | X | | Sanitary Sewers | | |
| Vandergrift | Westmoreland | 10,745 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Cities & Boro's 5,000 to 10,000 | | | | | | | |
| Avalon | Allegheny | 6,820 | X | | | | Group 1 |
| Brackenridge | Allegheny | 6,197 | X | | Dis. Plt. Add. San. Sewers | Order Issued Cooperates in Group 5 | Group 5 |
| Brentwood | Allegheny | 7,714 | X | | | Cooperates in Group 2 | |
| Crafton | Allegheny | 7,133 | X | | | | Group 4 |
| East Pittsburgh | Allegheny | 6,474 | X | | | Cooperates in Group 7 | |
| Emsworth | Allegheny | 5,171 | | | Disposal Plant | | |
| Etna | Allegheny | 7,991 | X | | | Cooperates in Group 13 | |
| Forest Hills | Allegheny | 5,116 | X | | | Cooperates in Group 7 | |
| Glassport | Allegheny | 8,618 | X | | Intercept-ing Sewer | | Group 8 |
| Millvale | Allegheny | 7,079 | X | | | Cooperates in Group 14 | |
| Mount Oliver | Allegheny | 7,055 | X | Treated at Brentwood | | | Group 2 |
| Oakmont | Allegheny | 6,046 | X | | 11th St. Sewer Ext. | | Penn Twp. Group 10 |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Pitcairn | Allegheny | 5,832 | X | | Treatment Plant | | |
| Rankin | Allegheny | 7,348 | X | | | | Group 6 |
| Sewickley | Allegheny | 5,558 | X | | | | Group 12 |
| Sharpsburg | Allegheny | 8,753 | X | | | | Group 13 |
| Tarentum | Allegheny | 10,000 | X | | | Cooperates in Group 5 | |
| Westview | Allegheny | 7,086 | X | | | Cooperates in Group 14 | Group 1 |
| Wilmerding | Allegheny | 6,604 | X | | Disposal Plt. | | Group 7 |
| Ford City | Armstrong | 6,117 | X | | Add. San. Sew. | Order Issued | |
| Kittanning | Armstrong | 7,172 | X | | Disposal Plt. | Order Issued | |
| Beaver | Beaver | 6,892 | X | | | | |
| Midland | Beaver | 6,153 | X | | | | |
| Monaca | Beaver | 7,861 | X | | Add. Sewers | Under Const. | |
| Nanty Glo | Cambria | 6,701 | X | | | | Sankertown |
| Titusville | Crawford | 7,978 | X | | | | |
| Johnsonburg | Elk | 5,153 | | | | | |
| Ridgway | Elk | 2,033 | | | | | |
| Saint Marys | Elk | 7,737 | | | | | |
| Corry | Erie | 6,641 | X | | Disposal Plt. | Order Issued | |
| Blairsville | Indiana | 5,343 | | | | | |
| Punxsutawney | Jefferson | 9,287 | X | | | | |
| Kane | McKean | 7,149 | X | | | | |
| Somerset | Somerset | 6,224 | X | | Disposal Plt. | | |
| Windber | Somerset | 9,166 | X | | | | |
| Centerville | Washington | 5,970 | X | | | Partial Sewers Company Towns Sewered only | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Monongahela | Washington | 7,582 | | | Public Sewers | | |
| Mount Pleasant | Westmoreland | 5,625 | | | | | |
| Parnassus | Westmoreland | 6,240 | | | | | |
| Scottdale | Westmoreland | 7,967 | X | | Reconst. Sewers | | |
| Cities & Boro's 2,500 to 5,000 | | | | | | | |
| Aspinwall | Allegheny | 4,702 | X | | Treatment Plant | Under Const. | |
| Ben Avon | Allegheny | 2,806 | X | | Ext. of San. Sewers | | Group 1 |
| Bridgeville | Allegheny | 4,313 | X | | | | Group 9 |
| Castle Shannon | Allegheny | 4,008 | X | Treated at Brentwood | | | Group 2 |
| Dravosburg | Allegheny | 2,719 | X | | Duquesne Ave. Sanitary Sew. | | Group 8 |
| East McKeesport | Allegheny | 2,832 | X | | Completion of Sewer System | | Group 7-8 |
| Edgewood | Allegheny | 4,760 | X | | | | Group 10 |
| Elizabeth | Allegheny | 2,601 | X | | | | Group 11 |
| Ingram | Allegheny | 4,239 | X | | | | Group 4 |
| Leetsdale | Allegheny | 2,829 | X | | | | Group 12 |
| McDonald | Allegheny | 3,520 | X | | Treatment Plt. | | |
| Port Vue | Allegheny | 3,812 | X | | | | Group 8 |
| Springdale | Allegheny | 4,541 | X | | | | Group 15 |
| Trafford (Part of) | Allegheny | 3,894 | X | | Treatment Wks. | | |
| Verona | Allegheny | 4,325 | X | | Sewage Treatment Plant | | Group 10 |

SEWAGE DISPOSAL SYSTEMS

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| West Homestead | Allegheny | 3,776 | X | | | | Group 2 |
| Apollo | Armstrong | 3,279 | X | | | | |
| Freeport | Armstrong | 3,318 | X | | | | |
| Leechburg | Armstrong | 4,136 | X | | | | |
| Freedom | Beaver | 3,058 | X | | | | |
| Cresson | Cambria | 2,626 | X | | Disposal Plant | | Sankertown |
| Dale | Cambria | 2,935 | X | | | | Johnstown |
| East Conemaugh | Cambria | 4,963 | X | | | | " |
| Ebensburg | Cambria | 3,601 | X | | Disposal Plant | | |
| Ferndale | Cambria | 2,747 | X | | | | Johnstown |
| Portage | Cambria | 4,649 | X | | | | Sankertown |
| South Fork | Cambria | 3,093 | X | | | | Summerhill |
| Westmont | Cambria | 3,287 | X | | | | Johnstown & Southmont |
| Clarion | Clarion | 3,521 | | | | | |
| Union City | Erie | 4,013 | X | | Disposal Plant | Order Issued | |
| Masontown | Fayette | 4,583 | X | | Add. Sewers | | |
| South Connellsville | Fayette | 2,821 | X | | | | Connellsville |
| Waynesburg | Greene | 4,884 | | | | | |
| Clymer | Indiana | 3,079 | | | | | |
| Brockway | Jefferson | 2,608 | | | | | |
| Brookville | Jefferson | 4,350 | X | | Add. Sewers | | |
| Reynoldsville | Jefferson | 3,542 | X | | | | |
| Coudersport | Potter | 2,824 | X | | | | |
| Meyersdale | Somerset | 3,247 | X | | | | |
| Polk | Venango | 3,658 | | | | | |
| Bentleyville | Washington | 3,426 | | | | | |

SEWAGE DISPOSAL SYSTEMS | Upper Ohio Basin

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Burgettstown | Washington | 2,508 | | | | | |
| North Charleroi | Washington | 2,552 | X | | | | |
| Derry | Westmoreland | 2,998 | X | X | | | |
| Irwin | Westmoreland | 3,648 | | | | | |
| North Bellevernon | Westmoreland | 3,090 | X | | | | |
| South Greensburg | Westmoreland | 3,292 | X | | | | Greensburg |
| South West Greens-burg | Westmoreland | 2,801 | X | | | | Greensburg |
| West Newton | Westmoreland | 2,815 | | | | | |
| Youngwood | Westmoreland | 2,746 | X | | Ext. of Sewers | | |
| Cities & Boro's 2,500 and Less | | | | | | | |
| Blawnox | Allegheny | 1,941 | X | X | | | |
| Bradford Woods | Allegheny | 376 | | | | | |
| Chalfont | Allegheny | 1,239 | X | | | Cooperates in Group 7 | |
| Cheswick | Allegheny | 1,269 | X | | | Cooperates in Group 15 | |
| Edgeworth | Allegheny | 1,803 | X | | | | Group 10 Penn Twp. |
| Glenfield | Allegheny | 866 | | | Sewer Syst. | | |
| Greentree | Allegheny | 1,584 | X | | New " " | | Group 2-4 |
| Haysville | Allegheny | 178 | X | | | | Group 12 |
| Heidelberg | Allegheny | 2,177 | X | | | | Group 4 |
| Liberty | Allegheny | 906 | X | | New Sewer Syst. | | Group 8 |
| Oakdale | Allegheny | 1,586 | X | X | | | |
| Osborne | Allegheny | 528 | X | | Ext. Sewers Dis. Plt. | Order Issued | Group 12 |

| Name of City, Boro, or Twp. | County | Pop.1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Rosslyn | Allegheny | 384 | X | | | Cooperates in Group 4 | |
| Thornburg | Allegheny | 306 | X | | | | Group 4 |
| Versailles | Allegheny | 2,386 | X | | | | Group 8 |
| Wall | Allegheny | 2,229 | X | | | | Group 7 |
| West Elizabeth | Allegheny | 1,267 | X | | | | Group 11 |
| Whitaker | Allegheny | 2,006 | X | | Ext. of Sewer System | | Group 3 |
| Applewold | Armstrong | 455 | X | | Disposal Plant | Order Issued | |
| Atwood | Armstrong | 174 | | | | | |
| Dayton | Armstrong | 846 | | | | | |
| Elderton | Armstrong | 377 | | | | | |
| Ford Cliff | Armstrong | 673 | | | | | |
| Manorville | Armstrong | 682 | | | | | |
| North Apollo | Armstrong | 1,482 | | | | | |
| Parker City | Armstrong | 936 | X | | | | |
| Rural Valley | Armstrong | 786 | | | | | |
| South Bethlehem | Armstrong | 541 | X | | | | New Bethlehem |
| West Kittanning | Armstrong | 1,104 | | | | | |
| Worthington | Armstrong | 809 | | | | | |
| Baden | Beaver | 1,954 | X | | Add. San. Sewers | | Harmony-Ambridge |
| Bridgewater | Beaver | 1,599 | | | | | |
| Conway | Beaver | 1,696 | X | | | | |
| Darlington | Beaver | 597 | | | | | |
| Frankfort Spring | Beaver | 121 | | | | | |
| Georgetown | Beaver | 294 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Glasgow | Beaver | 283 | | | | | |
| Hookstown | Beaver | 231 | | | | | |
| New Galilee | Beaver | 431 | | | | | |
| Shippingport | Beaver | 421 | | | | | |
| South Heights | Beaver | 573 | | | | | |
| Bruin | Butler | 634 | | | | | |
| Cherry Valley | Butler | 75 | | | | | |
| Eau Claire | Butler | 309 | | | | | |
| Fairview | Butler | 305 | | | | | |
| Karns City | Butler | 519 | | | | | |
| Millerstown | Butler | 1,263 | | | | | |
| Petrolia | Butler | 664 | | | | | |
| Saxonburg | Butler | 346 | | | | | |
| Brownstown | Cambria | 1,581 | X | | | | Lower Yoder Twp. |
| Cassandra | Cambria | 482 | | | | | |
| Daisytown | Cambria | 370 | | | | | |
| Franklin | Cambria | 2,379 | X | | | | Johnstown |
| Geistown | Cambria | 989 | | | | | |
| Lilly | Cambria | 2,334 | X | | | | |
| Lorain | Cambria | 1,268 | | | San. Sewers | | Johnstown |
| Scalp Level | Cambria | 1,894 | X | | | | Summerhill |
| Southmont | Cambria | 2,177 | X | | | | Westmont & Johnstown |
| Summerhill | Cambria | 833 | X | | | | South Fork |
| Vintondale | Cambria | 1,532 | X | | | | |
| Wilmore | Cambria | 435 | | | | | |
| Callensburg | Clarion | 344 | | | | | |
| Curllsville | Clarion | 205 | | | | | |
| East Brady | Clarion | 1,533 | | | Dis. Plant | Order Issued | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Edenburg | Clarion | 1,062 | | | | | |
| Foxburg | Clarion | 485 | X | | Dis. Plant Intercept. Sewer | | |
| Hawthorn | Clarion | 608 | | | | | |
| New Bethlehem | Clarion | 1,625 | | | Disposal Plant & Sanitary Sewers | | S. Bethlehem-Armstrong Co. |
| Rimersburg | Clarion | 1,635 | | | | | |
| Saint Petersburg | Clarion | 551 | | | | | |
| Shippensville | Clarion | 501 | | | | | |
| Sligo | Clarion | 935 | | | | | |
| Strattanville | Clarion | 587 | | | | | |
| Falls Creek | Clearfield | 220 | | | | | |
| Troutville | Clearfield | 248 | | | | | |
| Blooming Valley | Crawford | 182 | | | | | |
| Cambridge Springs | Crawford | 1,655 | X | | Disposal Plant | Order Issued | |
| Centerville | Crawford | 249 | | | | | |
| Cochranton | Crawford | 689 | X | | | | |
| Conneaut Lake | Crawford | 585 | | | | | |
| Geneva | Crawford | 261 | | | | | |
| Hydetown | Crawford | 481 | | | | | |
| Saegertown | Crawford | 648 | | | | | |
| Spartansburg | Crawford | 374 | | | | | |
| Townville | Crawford | 300 | | | | | |
| Venango | Crawford | 292 | | | | | |
| Woodcock | Crawford | 100 | | | | | |
| Edinboro | Erie | 921 | X | X | | | |
| Elgin | Erie | 204 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Mill Village | Erie | 368 | | | | | |
| Waterford | Erie | 871 | | | | | |
| Wattsburg | Erie | 288 | | | | | |
| Bellevernon | Fayette | 2,306 | X | X | Ext. of Sew. System | | |
| Dawson | Fayette | 731 | X | | | | |
| Dunbar | Fayette | 1,378 | | | | | |
| Everson | Fayette | 1,904 | X | | | | |
| Fairchance | Fayette | 2,193 | | | | | |
| Fayette City | Fayette | 1,410 | X | | | | |
| Markleysburg | Fayette | 279 | | | | | |
| Ohiopyle | Fayette | 458 | | | | | |
| Point Marion | Fayette | 2,282 | X | | | | |
| Smithfield | Fayette | 799 | | | | | |
| Vanderbilt | Fayette | 1,036 | X | | Completion of Sewage System | | |
| Tionesta | Forest | 684 | X | | Disposal Plt. | Order Issued | |
| Carmichaels | Greene | 683 | | | | | |
| Clarksville | Greene | 596 | | | | | |
| Greensboro | Greene | 535 | | | | | |
| Jefferson | Greene | 628 | | | | | |
| Mount Morris | Greene | 318 | | | | | |
| New Freeport | Greene | 514 | | | | | |
| Rices Landing | Greene | 1,047 | | | | | |
| Armagh | Indiana | 260 | | | | | |
| Creekside | Indiana | 604 | | | | | |
| Homer City | Indiana | 2,119 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Jacksonville | Indiana | 219 | | | | | |
| Marion Center | Indiana | 509 | | | | | |
| Plumville | Indiana | 586 | | | | | |
| Saltsburg | Indiana | 1,061 | | | | | |
| Shelocta | Indiana | 114 | | | | | |
| Smicksburg | Indiana | 235 | | | | | |
| Big Run | Jefferson | 864 | | | | | |
| Corsica | Jefferson | 411 | | | | | |
| Falls Creek | Jefferson | 1,218 | | | | | |
| Summerville | Jefferson | 1,065 | | | | | |
| Sykesville | Jefferson | 2,006 | | | | | |
| Timblin | Jefferson | 474 | | | | | |
| Worthville | Jefferson | 99 | | | | | |
| Enon Valley | Lawrence | 380 | | | | | |
| Eldred | McKean | 1,107 | | | | | |
| Lewis Run | McKean | 833 | | | | | |
| Mount Jewett | McKean | 1,366 | X | | Improv. To Sewer System | | |
| Port Allegheny | McKean | 2,140 | X | | | | |
| Smethport | McKean | 1,652 | X | | | | |
| New Lebanon | Mercer | 222 | | | | | |
| Sandy Lake | Mercer | 753 | | | | | |
| Sheakleyville | Mercer | 99 | | | | | |
| Oswago | Potter | 188 | | | | | |
| Shinglehouse | Potter | 1,265 | | | | | |
| Addison | Somerset | 190 | | | | | |
| Benson | Somerset | 405 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Berlin | Somerset | 1,387 | X | | | | |
| Boswell | Somerset | 1,742 | X | | | | |
| Casselman | Somerset | 141 | | | | | |
| Central City | Somerset | 2,166 | | | | | |
| Confluence | Somerset | 1,228 | X | | | | |
| Garrett | Somerset | 947 | X | | | | |
| Hooversville | Somerset | 1,417 | X | | | | |
| Jennerstown | Somerset | 290 | | | | | |
| New Centerville | Somerset | 149 | | | | | |
| Paint | Somerset | 1,348 | | | | | |
| Rockwood | Somerset | 1,324 | X | | | | |
| Salisbury | Somerset | 745 | X | | | | |
| Shanksville | Somerset | 337 | | | | | |
| Somerfield | Somerset | 157 | | | | | |
| Stoystown | Somerset | 488 | X | | | | |
| Ursina | Somerset | 299 | | | | | |
| Clintonville | Venango | 331 | | | Disposal Plt. Sewage System | | |
| Cooperstown | Venango | 198 | | | | | |
| Emlenton | Venango | 1,252 | X | | Disposal Plt. | Order Issued | |
| Pleasantville | Venango | 797 | X | X | | | |
| Rouseville | Venango | 1,125 | X | | Sewer Ext. | | |
| Utica | Venango | 200 | | | | | |
| Clarendon | Warren | 860 | | | | | |
| Grand Valley | Warren | 325 | | | | | |
| Bear Lake | Warren | 191 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Sugar Grove | Warren | 463 | | | | | |
| Tidioute | Warren | 980 | X | | Disposal Plt., Intercept. | Order Issued | |
| Youngsville | Warren | 1,926 | X | | | | |
| Allenport | Washington | 1,126 | | | | | |
| Beallsville | Washington | 654 | | | | | |
| California | Washington | 2,427 | X | | | | |
| Claysville | Washington | 937 | | | | | |
| Coal Center | Washington | 625 | | | | | |
| Cokeburg | Washington | 1,358 | | | | | |
| Deemston | Washington | 630 | | | | | |
| Dunlevy | Washington | 549 | | | | | |
| East Washington | Washington | 1,822 | | | | | |
| Elco | Washington | 653 | | | San. Sewers | | |
| Ellsworth | Washington | 1,909 | | | | | |
| Finleyville | Washington | 657 | | | | | |
| Houston | Washington | 1,775 | | | | | |
| Long Branch | Washington | 233 | | | | | |
| Marianna | Washington | 1,725 | | | | | |
| Midway | Washington | 1,037 | | | | | |
| New Eagle | Washington | 1,684 | | | | | |
| Roscoe | Washington | 1,304 | X | | | | |
| Speers | Washington | 671 | | | Sew. Syst. | | |
| Stockdale | Washington | 762 | X | | | | |
| Twilight | Washington | 230 | | | | | |
| West Alexander | Washington | 490 | | | | | |
| West Middletown | Washington | 332 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Adamsburg | Westmoreland | 252 | | | | | |
| Arona | Westmoreland | 549 | | | | | |
| Avonmore | Westmoreland | 1,229 | | | | | |
| Bolivar | Westmoreland | 708 | | | | | |
| Donegal | Westmoreland | 203 | | | | | |
| East Vandergrift | Westmoreland | 2,270 | X | | | | |
| Export | Westmoreland | 2,223 | | | Sewer System | | |
| Hunkers | Westmoreland | 381 | | | | | |
| Hyde Park | Westmoreland | 749 | | | | | |
| Ligonier | Westmoreland | 2,250 | | | | | |
| Livermore | Westmoreland | 250 | | | | | |
| Madison | Westmoreland | 377 | | | | | |
| New Alexandria | Westmoreland | 624 | | | | | |
| Manor | Westmoreland | 1,342 | X | | Sewer Ext. | | |
| New Florence | Westmoreland | 856 | | | | | |
| New Salem | Westmoreland | 956 | | | | | |
| North Irwin | Westmoreland | 1,105 | | | | | |
| Penn | Westmoreland | 1,014 | X | | | | |
| Seward | Westmoreland | 925 | | | | | |
| Smithton | Westmoreland | 703 | | | | | |
| Suterville | Westmoreland | 871 | | | | | |
| West Leechburg | Westmoreland | 1,051 | | | | | |
| Youngstown | Westmoreland | 523 | | | | | |
| UNINCORPORATED TOWNS & VILLAGES | | | | | | | |
| Allison Park | Allegheny | 828 | | | | | |
| Bairdford | Allegheny | 1,000 | | | | | |
| Banksville | Allegheny | 1,400 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Blythedale | Allegheny | 1,000 | | | | | |
| Boston | Allegheny | 600 | | | | | |
| Bower Hill | Allegheny | 500 | | | | | |
| Broughton | Allegheny | 2,200 | | | | | |
| Buena Vista | Allegheny | 600 | | | | | |
| Bunola | Allegheny | 500 | | | | | |
| Carnot | Allegheny | 500 | | | | | |
| Carrick | Allegheny | 8,305 | | | | | |
| Center | Allegheny | 500 | | | | | |
| Cuddy | Allegheny | 800 | | | | | |
| Curtisville | Allegheny | 1,800 | | | | | |
| Edgewood Acres | Allegheny | 600 | | | | | |
| Elwyn | Allegheny | 500 | | | | | |
| Fair Oaks | Allegheny | 1,100 | | | | | |
| Gallatin | Allegheny | 900 | | | | | |
| Glassmere | Allegheny | 1,900 | | | | | |
| Glen | Allegheny | 2,130 | | | | | |
| Glendale | Allegheny | 2,500 | | | | | |
| Glenshaw | Allegheny | 500 | | | | | |
| Glenwillard | Allegheny | 650 | | | | | |
| Greenock | Allegheny | 800 | | | | | |
| Groveton | Allegheny | 800 | | | | | |
| Harwick | Allegheny | 1,150 | | | | | |
| Hays | Allegheny | 2,331 | | | | | |
| Hickman | Allegheny | 525 | | | | | |
| Idlewood | Allegheny | 650 | | | | | |
| Imperial | Allegheny | 819 | | | | | |
| Indianola | Allegheny | 532 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Ingomar | Allegheny | 3,000 | | | | | |
| Kennywood Park | Allegheny | 500 | | | | | |
| Library | Allegheny | 1,115 | | | | | |
| Lincoln Place | Allegheny | 1,026 | | | | | |
| Linhart | Allegheny | 500 | | | | | |
| Long Run | Allegheny | 500 | | | | | |
| Mollinauer | Allegheny | 700 | | | | | |
| Moon Run | Allegheny | 1,267 | | | | | |
| Morgan | Allegheny | 1,000 | | | | | |
| Natrona | Allegheny | 7,200 | | | | | |
| Noblestown | Allegheny | 600 | | | | | |
| North Star | Allegheny | 750 | | | | | |
| North Star Junction | Allegheny | 524 | | | | | |
| Oak Hill | Allegheny | 1,200 | | | | | |
| Perrysville | Allegheny | 1,000 | | | | | |
| Port Perry | Allegheny | 1,031 | | | | | |
| Preston | Allegheny | 2,000 | | | | | |
| Redman Mills | Allegheny | 515 | | | | | |
| Rural Ridge | Allegheny | 700 | | | | | |
| Russellton | Allegheny | 4,000 | | | | | |
| Smithdale | Allegheny | 625 | | | | | |
| Sygan | Allegheny | 500 | | | | | |
| Terrace | Allegheny | 500 | | | | | |
| Treveskyn | Allegheny | 800 | | | | | |
| Tyre | Allegheny | 750 | | | | | |
| Unity | Allegheny | 700 | | | | | |
| Universal | Allegheny | 810 | | | | | |
| Warrendale | Allegheny | 500 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat- ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Wilson | Allegheny | 3,243 | | | | | |
| Wolfton | Allegheny | 3,000 | | | | | |
| Woodville | Allegheny | 4,000 | | | | | |
| Bradys Bend | Armstrong | 800 | | | | | |
| Margaret | Armstrong | 500 | | | | | |
| McGrann | Armstrong | 500 | | | | | |
| Oak Ridge | Armstrong | 500 | | | | | |
| Sagamore | Armstrong | 1,750 | | | | | |
| Seminole | Armstrong | 500 | | | | | |
| Templeton | Armstrong | 1,000 | | | | | |
| Yatesboro | Armstrong | 2,067 | | | | | |
| College Hill | Beaver | 2,643 | | | | | |
| New Sheffield | Beaver | 1,500 | | | | | |
| Vanport | Beaver | 875 | | | | | |
| West Aliquippa | Beaver | 2,931 | | | | | |
| Cabot | Butler | 500 | | | | | |
| Sarver | Butler | 530 | | | | | |
| Beaverdale | Cambria | 1,643 | | | | | |
| Cardiff | Cambria | 500 | | | | | |
| Colver | Cambria | 1,800 | | | | | |
| Dunlo | Cambria | 2,000 | | | | | |
| Eastmont | Cambria | 500 | | | | | |
| Ehrenfield | Cambria | 1,100 | | | | | |
| Llanfair | Cambria | 500 | | | | | |
| Lloydell | Cambria | 875 | | | | | |
| Nettleton | Cambria | 500 | | | | | |
| Parkhill | Cambria | 700 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Revloc | Cambria | 526 | | | | | |
| Sonman | Cambria | 800 | | | | | |
| Saint Michael | Cambria | 521 | | | | | |
| Twin Rocks | Cambria | 1,541 | | | | | |
| Fairmont City | Clarion | 500 | | | | | |
| West Monterey | Clarion | 610 | | | | | |
| Helvetia | Clearfield | 500 | | | | | |
| Fredericksburg | Crawford | 500 | | | | | |
| Dagus Mines | Elk | 1,500 | | | | | |
| Durant City | Elk | 1,000 | | | | | |
| Eagle Valley | Elk | 500 | | | | | |
| Gillen | Elk | 700 | | | | | |
| West Ridgway | Elk | 1,000 | | | | | |
| Wilcox | Elk | 900 | | | | | |
| Adelaide | Fayette | 550 | | | | | |
| Alica | Fayette | 500 | | | | | |
| Allison | Fayette | 1,200 | | | | | |
| Antram | Fayette | 1,200 | | | | | |
| Arnold City | Fayette | 500 | | | | | |
| Brownfield | Fayette | 1,521 | | | | | |
| Bute | Fayette | 1,000 | | | | | |
| Cardale | Fayette | 750 | | | | Public Sewers | |
| Chestnut Ridge | Fayette | 775 | | | | | |
| East Connellsville | Fayette | 500 | | | | | |
| Edinborn Jc. | Fayette | 1,224 | | | | | |
| Fairbank | Fayette | 500 | | | | | |
| Footdale | Fayette | 500 | | | | | |
| Gates | Fayette | 1,200 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Gillespie | Fayette | 500 | | | | | |
| Griffin | Fayette | 500 | | | | | |
| Grindstone | Fayette | 528 | | | | | |
| Hopwood | Fayette | 821 | | | | | |
| Juniata | Fayette | 1,410 | | | | | |
| Kifertown | Fayette | 600 | | | | | |
| Lake Lynn | Fayette | 500 | | | | | |
| Lambert | Fayette | 600 | | | | | |
| Lamberton | Fayette | 600 | | | | | |
| LaBelle | Fayette | 1,025 | | | | | |
| Leckrone | Fayette | 700 | | | | | |
| Leisinring | Fayette | 850 | | | | | |
| Martin | Fayette | 1,256 | | | | | |
| Maxwell | Fayette | 1,200 | | | | | |
| Melcroft | Fayette | 500 | | | | | |
| McClellandtown | Fayette | 821 | | | | | |
| Monarch | Fayette | 700 | | | | | |
| Mount Braddock | Fayette | 800 | | | | | |
| Newcomer | Fayette | 700 | | | | | |
| New Salem | Fayette | 900 | | | | | |
| Newell | Fayette | 1,200 | | | | | |
| Oliphant Furnace | Fayette | 500 | | | | | |
| Oliver | Fayette | 1,057 | | | | | |
| Orient | Fayette | 1,625 | | | | | |
| Perryopolis | Fayette | 825 | | | | | |
| Filbert | Fayette | 900 | | | | | |
| Republic | Fayette | 2,500 | | | Public Sewers | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Ronco | Fayette | 1,054 | | | | | |
| Rowes Run | Fayette | 2,000 | | | | | |
| Smock | Fayette | 1,036 | | | | | |
| Star Junction | Fayette | 3,055 | | | | | |
| Trotter | Fayette | 950 | | | | | |
| Waltersburg | Fayette | 550 | | | | | |
| Washington Mines | Fayette | 1,300 | | | | | |
| Whitsett | Fayette | 750 | | | | | |
| York Run | Fayette | 1,627 | | | | | |
| Brookston | Forest | 517 | | | | | |
| Kellettville | Forest | 839 | | | | | |
| Marienville | Forest | 700 | | | | | |
| Bobtown | Greene | 2,000 | | | | | |
| Brave | Greene | 641 | | | | | |
| Crucible | Greene | 1,800 | | | | | |
| Mather | Greene | 2,500 | | | | | |
| Nemacolin | Greene | 2,600 | | | | | |
| Penna. Furnace | Huntingdon | 500 | | | | | |
| Arcadia | Indiana | 500 | | | | | |
| Commodore | Indiana | 800 | | | | | |
| Coral | Indiana | 725 | | | | | |
| Dixonville | Indiana | 1,500 | | | | | |
| Earnest | Indiana | 1,500 | | | | | |
| Edri | Indiana | 515 | | | | | |
| Graceton | Indiana | 500 | | | | | |
| Heilwood | Indiana | 1,000 | | | | | |
| Iselin | Indiana | 2,050 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Josephine | Indiana | 500 | | | | | |
| Luzerne Mines | Indiana | 1,200 | | | | | |
| McIntyre | Indiana | 600 | | | | | |
| Mowrytown | Indiana | 815 | | | | | |
| Robinson | Indiana | 900 | | | | | |
| Rossiter | Indiana | 2,000 | | | | | |
| Sides | Indiana | 500 | | | | | |
| Wallopsburg | Indiana | 515 | | | | | |
| Wehrum | Indiana | 619 | | | | | |
| Anita | Jefferson | 1,000 | | | | | |
| Conifer | Jefferson | 1,224 | | | | | |
| Corner | Jefferson | 620 | | | | | |
| Crenshaw | Jefferson | 500 | | | | | |
| Sigel | Jefferson | 950 | | | | | |
| Valier | Jefferson | 500 | | | | | |
| Westville | Jefferson | 538 | | | | | |
| Cyclone (Simpson) | McKean | 750 | | | | | |
| Duke Center | McKean | 1,200 | | | | | |
| East Kane | McKean | 600 | | | | | |
| Hazel Hurst | McKean | 650 | | | | | |
| Ludlow | McKean | 1,400 | | | | | |
| Rixford | McKean | 518 | | | | | |
| Roulette | Potter | 500 | | | | | |
| Cairnbrook | Somerset | 1,500 | | | | | |
| Foustwell | Somerset | 700 | | | | | |
| Gray | Somerset | 800 | | | | | |
| Holsopple | Somerset | 1,100 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Jenners | Somerset | 1,500 | | | | | |
| Jerome | Somerset | 1,032 | | | | | |
| Listie | Somerset | 650 | | | | | |
| MacDonaldton | Somerset | 1,035 | | | | | |
| Quecreek | Somerset | 600 | | | | | |
| Ralphton | Somerset | 600 | | | | | |
| Seanor | Somerset | 500 | | | | | |
| Thomas Mills | Somerset | 600 | | | | | |
| Bullion | Venango | 500 | | | | | |
| Reno | Venango | 800 | | | | | |
| Rockeygrove | Venango | 1,065 | | | | | |
| Akeley | Warren | 585 | | | | | |
| North Warren | Warren | 900 | | | | | |
| Russell | Warren | 500 | | | | | |
| Sheffield | Warren | 2,500 | | | | | |
| Anderson | Washington | 512 | | | | | |
| Atlasburg | Washington | 600 | | | | | |
| Avella | Washington | 3,000 | | | | | |
| Blainsburg | Washington | 1,000 | | | | | |
| Bulger | Washington | 500 | | | | | |
| Catsburg | Washington | 2,000 | | | | | |
| Cherry Valley | Washington | 1,425 | | | | | |
| Coal Bluff | Washington | 526 | | | | | |
| Courtney | Washington | 617 | | | | | |
| Daisytown | Washington | 1,500 | | | | | |
| Elrama | Washington | 1,500 | | | | | |
| Fredericktown | Washington | 1,050 | | | | | |
| Frye (Ivanhoe) | Washington | 513 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Groups Nos.) |
|---|---|---|---|---|---|---|---|
| Gastonville | Washington | 500 | | | | | |
| Hackett | Washington | 525 | | | | | |
| Hickory | Washington | 600 | | | | | |
| Hills | Washington | 1,400 | | | | | |
| Joffre | Washington | 750 | | | | | |
| Lawrence | Washington | 1,400 | | | | | |
| Lock No. 4 | Washington | 618 | | | | | |
| Langeloth | Washington | 1,300 | | | | | |
| Meadow Lands | Washington | 2,025 | | | | | |
| Millsboro | Washington | 1,536 | | | | | |
| Morganza | Washington | 1,500 | | | | | |
| Muse | Washington | 2,000 | | | | | |
| Penowa | Washington | 1,187 | | | | | |
| Richeyville | Washington | 1,600 | | | | | |
| Richfol | Washington | 2,300 | | | | | |
| Slovan | Washington | 1,800 | | | | | |
| Southview | Washington | 500 | | | | | |
| Strabane | Washington | 1,700 | | | | | |
| Tylerdale | Washington | 1,580 | | | | | |
| Van Voohris | Washington | 800 | | | | | |
| Vestaburg | Washington | 1,062 | | | | | |
| West Brownsville Jct. | Washington | 500 | | | | | |
| Westland | Washington | 800 | | | | | |
| West Monessen | Washington | 618 | | | | | |
| Wolfdale | Washington | 550 | | | | | |
| Acme | Westmoreland | 1,300 | | | | | |
| Alverton | Westmoreland | 500 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Baggaley | Westmoreland | 1,050 | | | | | |
| Bradenville | Westmoreland | 1,400 | | | | | |
| Braeburn | Westmoreland | 1,300 | | | | | |
| Carpentertown | Westmoreland | 518 | | | | | |
| Claridge | Westmoreland | 1,200 | | | | | |
| Cokeville | Westmoreland | 540 | | | | | |
| Crabtree | Westmoreland | 1,106 | | | | | |
| Crowns Nest | Westmoreland | 500 | | | | | |
| Delmont | Westmoreland | 721 | | | | | |
| Forbes Road | Westmoreland | 695 | | | | | |
| Grapeville | Westmoreland | 1,200 | | | | | |
| Guffey | Westmoreland | 612 | | | | | |
| Hahntown | Westmoreland | 514 | | | | | |
| Hannastown | Westmoreland | 950 | | | | | |
| Harrison City | Westmoreland | 500 | | | | | |
| Haydenville | Westmoreland | 518 | | | | | |
| Hecla | Westmoreland | 3,000 | | | | | |
| Herminie | Westmoreland | 2,500 | | | | | |
| Hostetter | Westmoreland | 948 | | | | | |
| Huffs Station | Westmoreland | 675 | | | | | |
| Humphrey | Westmoreland | 600 | | | | | |
| Jacobs Creek | Westmoreland | 550 | | | | | |
| Larimer | Westmoreland | 1,527 | | | | | |
| Lowber | Westmoreland | 718 | | | | | |
| Lusk | Westmoreland | 515 | | | | | |
| Luxor | Westmoreland | 725 | | | | | |
| Marguerite | Westmoreland | 600 | | | | | |
| Morewood | Westmoreland | 500 | | | | | |
| Murraysville | Westmoreland | 800 | | | | | |

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With (See Page B-28 for Group Nos.) |
|---|---|---|---|---|---|---|---|
| Mutual | Westmoreland | 810 | | | | | |
| New Derry | Westmoreland | 550 | | | | | |
| Oceano | Westmoreland | 500 | | | | | |
| Pershing | Westmoreland | 1,000 | | | | | |
| Pleasant Unity | Westmoreland | 800 | | | | | |
| Pricedale | Westmoreland | 1,036 | | | | | |
| Loyalhanna | Westmoreland | 800 | | | | | |
| Ruffs Dale | Westmoreland | 500 | | | | | |
| Salina | Westmoreland | 1,200 | | | | | |
| Scott Haven | Westmoreland | 500 | | | | | |
| Shafton | Westmoreland | 800 | | | | | |
| Slickville | Westmoreland | 1,200 | | | | | |
| Somers | Westmoreland | 1,036 | | | | | |
| Southwest | Westmoreland | 3,000 | | | | | |
| Standard | Westmoreland | 3,053 | | | | | |
| Swedetown | Westmoreland | 800 | | | | | |
| Torrance | Westmoreland | 500 | | | | | |
| United | Westmoreland | 716 | | | | | |
| Van Meter | Westmoreland | 750 | | | | | |
| Wendel | Westmoreland | 700 | | | | | |
| West Side | Westmoreland | 600 | | | | | |
| Whitney | Westmoreland | 925 | | | | | |
| Wilpen | Westmoreland | 710 | | | | | |
| Wyano | Westmoreland | 1,400 | | | | | |
| Yukon | Westmoreland | 2,000 | | | | | |

## ALLEGHENY COUNTY

### GROUPING OF SEWERED MUNICIPALITIES FOR CO-OPERATIVE SEWAGE TREATMENT

GROUP 1 (AVALON - ROSS TWP.) BELLVIEW - WEST VIEW, BEN AVON - BEN AVON HEIGHTS - PITTSBURGH.

GROUP 2 (BALDWIN TWP. - PITTSBURGH - MT. OLIVER - BRENTWOOD - CASTLE SHANNON - DORMONT - MT. LEBANON TWP.) MIFFLIN TWP. - HOMESTEAD - WEST HOMESTEAD - GREENTREE.

GROUP 3 (DUQUESNE - MIFFLIN TWP.) - (WHITAKER - MUNHALL)

GROUP 4 (CARNEGIE - ROSSLYN FARMS) PITTSBURGH - MT. LEBANON TWP. SCOTT TWP. - COLLIER TWP. - HEIDLEBERG - THORNBURG - ROBINSON TWP. - CRAFTON - INGRAM - GREENTREE - MCKEES ROCK - STOWE TWP.

GROUP 5 (BRACKENRIDGE - TARENTUM - HARRISON TWP.) FRAZER TWP.

GROUP 6 (BRADDOCK - NORTH BRADDOCK) RANKIN - SWISSVALE.

GROUP 7 (CHALFANT - FOREST HILLS - NORTH BRADDOCK - EAST PITTSBURGH) WALL - EAST MCKEESPORT - WILMERDING TURTLE CREEK - NORTH VERSAILLES TWP.

GROUP 8 DRAVOSBURG - MCKEESPORT - EAST MCKEESPORT - NORTH VERSAILLES TWP. - VERSAILLES TWP. VERSAILLES GLASS PORT - PORT VUE - LIBERTY.

GROUP 9 BRDIGEVILLE - MT. LEBANON TWP.

GROUP 10 (EDGEWOOD - PITTSBURGH - SWISSVALE) WILKENSBURG - PENN TWP. - OAKMONT - VERONA.

GROUP 11 ELIZABETH - WEST ELIZABETH.

GROUP 12 EDGEWORTH - HAYSVILLE - OSBORNE - SEWICKLEY - LEETSDALE - LEET TWP.

GROUP 13 (ETNA - SHALER TWP.) - SHARPSBURG.

ALLEGHENY COUNTY

GROUPING OF SEWERED MUNICIPALITIES FOR CO-OPERATIVE SEWAGE TREATMENT

(Continued)

GROUP 14 (MILLVALE - WEST VIEW - ROSS TWP. - SHALER TWP.)

GROUP 15 (CHESWICK - SPRINGDALE)

GROUP 16 (RESERVE TWP. - PITTSBURGH)

NOTE: Parentheses denote those municipalities now co-operating within each group.

## APPENDIX B

SEWAGE DISPOSAL SYSTEMS — Beaver Basin

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities & Boro's 25,000 to 50,000 | | | * | ** | | | |
| Butler | Butler | 28,527 | X | X | Add. San. Sewers | | |
| New Castle | Lawrence | 46,695 | X | X | | | |
| Sharon | Mercer | 25,446 | X | X | Add. Sewers & Treatment | | |
| Cities & Boro's 10,000 to 25,000 | | | | | | | |
| Beaver Falls | Beaver | 16,284 | X | X | Add. Sewers & Treatment | | |
| Ellwood City | Lawrence | 12,832 | X | X | | | |
| Farrell | Mercer | 13,480 | X | | Treatment Wks. | Treat. Wks. Bldg. P.W.A. Order Issued | |
| Cities & Boro's 5,000 to 10,000 | | | | | | | |
| New Brighton | Beaver | 9,451 | X | | | | |
| Rochester | Beaver | 7,770 | X | | | | Rochester Twp. |
| Greenville | Mercer | 9,566 | X | X | | | |
| Grove City | Mercer | 6,529 | X | X | | Treat. Wks. Bldg. P.W.A. | |
| Sharpsville | Mercer | 5,331 | X | X | | | |

* Existing public sewers designated by X.

** Existing sewage treatment plant designated by X.

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities & Boro's 2,500 & Less | | | | | | | |
| East Rochester | Beaver | 773 | | | | | |
| Eastvale | Beaver | 601 | | | | | |
| Fallston | Beaver | 578 | | | | | |
| Homewood | Beaver | 320 | | | | | |
| Koppel | Beaver | 947 | X | X | | | |
| Patterson Heights | Beaver | 632 | X | | | Treat. At Beaver Falls | |
| West Mayfield | Beaver | 951 | | | | | |
| Callery | Butler | 307 | | | | | |
| Connoquenessing | Butler | 512 | | | | | |
| East Butler | Butler | 515 | | | | | |
| Evansburg | Butler | 1,596 | X | X | Sewer Exts. | | |
| Harmony | Butler | 1,006 | X | X | | | |
| Harrisville | Butler | 611 | | | | | |
| Mars | Butler | 1,350 | X | X | | | |
| Portersville | Butler | 343 | | | | | |
| Prospect | Butler | 528 | | | | | |
| Slippery Rock | Butler | 1,431 | X | X | Enlarged Disposal Plant | | |
| Valencia | Butler | 303 | | | | | |
| West Liberty | Butler | 188 | | | | | |
| West Sunbury | Butler | 254 | | | | | |
| Zelienople | Butler | 2,415 | X | X | | | Jackson Twp. |
| Linesville | Crawford | 1,008 | X | | Sewer Exts. | | |
| Bessemer | Lawrence | 1,681 | | | | | |
| Ellport | Lawrence | 1,050 | | | | | |

SEWAGE DISPOSAL SYSTEMS

Beaver Basin

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers | Treat-ment | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| New Wilmington | Lawrence | 1,041 | X | X | | | |
| South New Castle | Lawrence | 1,094 | | | Sewers | | |
| Volant | Lawrence | 209 | | | | | |
| Wampum | Lawrence | 781 | | | | | |
| Clarksville | Mercer | 261 | | | Sewers | | |
| Fredonia | Mercer | 559 | | | | | |
| Jackson Center | Mercer | 378 | | | Disposal Plt. | (School) | |
| Jamestown | Mercer | 750 | X | | Treatment Wks. | Order Issued | |
| Mercer | Mercer | 2,455 | X | X | | | |
| Stoneboro | Mercer | 1,332 | | | | | |
| West Middlesex | Mercer | 1,261 | X | | Treatment Wks. | Order Issued | |
| Wheatland | Mercer | 1,531 | | | | | |
| UNINCORPORATED VILLAGES | | | | | | | |
| 500 or Over | | | | | | | |
| College Hill | Beaver | 2,643 | | | | | |
| Erico | Butler | 520 | | | | | |
| Lyndora | Butler | 3,057 | | | | | |
| Renfrew | Butler | 518 | | | | | |
| Edinburg | Lawrence | 650 | | | | | |
| Hillsville | Lawrence | 2,000 | | | | | |
| Mahoningtown | Lawrence | 4,800 | | | | | |
| Mount Jackson | Lawrence | 700 | | | | | |
| Neshannock | Lawrence | 537 | | | | | |
| Rigby | Lawrence | 1,000 | | | | | |
| West Pittsburgh | Lawrence | 700 | | | | | |

SEWAGE DISPOSAL SYSTEMS

Erie Basin

| Name of City, Boro, or Twp. | County | Pop.-1934 Estimated | Public Sewers * | Treat-ment ** | Needs | Remarks | Should Cooperate With |
|---|---|---|---|---|---|---|---|
| Cities over 100,000 | | | | | | | |
| Erie | Erie | 108,093 | X | X | San. Sewers | | Wesleyville |
| Boro's 2,500 to 5,000 | | | | | | | |
| North East | Erie | 3,814 | X | X | Enlarged Disposal Plant | | |
| Wesleyville | Erie | 2,994 | X | | | Treated at Erie | Erie |
| Boro's 2,500 and Less | | | | | | | |
| Conneautville | Crawford | 936 | | | | | |
| Springboro | Crawford | 509 | | | | | |
| Albion | Erie | 1,842 | | | | | |
| Cranesville | Erie | 632 | | | | | |
| East Springfield | Erie | 441 | | | | | |
| Fairview | Erie | 514 | | | | | |
| Girard | Erie | 2,382 | X | X | | | |
| Middleboro | Erie | 389 | | | | | |
| North Girard (Incl. in Girard Twp.) | Erie | 1,077 | | | | | |
| Platea | Erie | 244 | | | | | |

* Existing public sewers designated by X.  ** Existing sewage treatment plant designated by X.